INDEX

AARONSON, S. A. *See* Todaro, G. J., 1272
Absorption of alkali cations by plant cells (Welch and Epstein), 447
Acceptor activity of dimers of alanine tRNA (Loehr and Keller), 1115
Acetabularia mediterranea RNA, *in vitro* translation of (Farber *et al.*), 843
N-Acetylphenylalanyl-tRNA and polyphenylalanine synthesis (Klem and Nakamoto), 1349
N-Acetyltriphenylalanyl-tRNA, synthesis of (Haenni and Lucas-Lenard), 1363
Actin site and muscle contraction (T. L. Hill), 98
Actinomycin D, effect on tyrosine transaminase (Reel and Kenney), 200; effect on interferon induction (Field *et al.*), 340
Active site of subtilisin (Markland *et al.*), 1440
Acyl migration in adenosine derivatives (Neumann *et al.*), 1207
ADA, G. L., and C. R. PARISH. Low Zone Tolerance to Bacterial Flagellin in Adult Rats: A Possible Role for Antigen Localized in Lymphoid Follicles, 556
ADAIR, L. B., J. E. WILSON, J. W. ZEMP, and E. GLASSMAN. Brain Function and Macromolecules, III. Uridine Incorporation into Polysomes of Mouse Brain during Short-Term Avoidance Conditioning, 606
———, J. E. WILSON, and E. GLASSMAN. Brain Function and Macromolecules, IV. Uridine Incorporation into Polysomes of Mouse Brain during Different Behavioral Experiences, 917
Addition compounds of water and phenols (D'Aprano and Fuoss), 1183
Adenosine, intramolecular acyl migration in derivatives of (Neumann *et al.*), 1207
Adenosine phosphate: 5′-AMP, intermediate with DNA in polynucleotide-joining reaction (Olivera *et al.*), 237; 3′,5′-AMP, effect on Ca^{++} and K^{+} fluxes in rat liver (Friedmann and Park), 504; 5′-ATP, binding in N_2-reducing system (Bui and Mortenson), 1021; 3′-AMP and 3′,5′-cyclic AMP, effects on enzyme secretion in mouse pancreas (Kulka and Sternlicht), 1123; 3′,5′-cyclic AMP and β-galactosidase synthesis (Pastan and Perlman), 1336
Adenovirus 5 capsid proteins, cytoplasmic synthesis (Velicer and Ginsberg), 1264
Adenovirus 12, effect on transformation-susceptible human cell strains (Todaro and Aaronson), 1272
Adenylate kinase equilibrium constant, and magnesium in cells (Rose), 1079
ADHYA, S., P. CLEARY, and A. CAMPBELL. A Deletion Analysis of Prophage Lambda and Adjacent Genetic Regions, 956
ADLER, H. I. *See* Cohen, A., 61
AGARWAL, S. S. *See* Loeb, L. A., 827
Alanine tRNA (Schulman and Chambers), 308; (Loehr and Keller), 1115
Alcohol dehydrogenase, control in developing maize (Efron and Schwartz), 586
Algebras, simple flexible (Block), 394
Alkali cation absorption in plant cells (Welch and Epstein), 447
Allografts, effect of thymosin and its antiserum, in mice (Hardy *et al.*), 875
Allysine, conversion of peptide-bound lysine to (Pinnell and Martin), 708
Alpha chain polypeptides of mouse hemoglobins (Hilse and Popp), 930
ALPHER, R. A., and G. GAMOW. A Possible Relation between Cosmological Quantities and the Characteristics of Elementary Particles, 363
Aluminum alloy, superconductivity above 20.5°K (Arrhenius *et al.*), 621
Ambiguously perceivable surfaces (Julesz and Johnson), 437
Amino acid ambiguity in hemoglobin polypeptides (Hilse and Popp), 930
Amino acid code degeneracy, role in protein synthesis (Mitchell), 742
Amino acid sequence: of heavy and light polypeptide chains (Gottlieb *et al.*), 168; of encephalitogenic peptides (Eylar and Hashim), 644; in human γG immunoglobulin (Rutishauser *et al.*), 1414; of subtilisins (Markland *et al.*), 1440
Aminoacyl-tRNA, recognition site for (Schulman and Chambers), 308; enzymatic hydrolysis of (Vogel *et al.*), 701
δ-Aminolevulinic acid (ALA)-synthetase, steroid induction in chick embryo liver (Kappas *et al.*), 509
Amphotericin B, effects on electroplax (Silman and Karlin), 674
ANDERSON, R. L. *See* Hanson, T. E., 269
ANFINSEN, C. B. *See* Cuatrecasas, P., 636
———. *See* Schechter, A. N., 1478
ANGELETTI, P. *See* Zanini, A., 835
ANGIONI, G. *See* Gandini, E., 945
Antibiotics: polyene macrolides, and serum cholesterol levels (Schaffner and Gordon), 36; rifampicin, and RNA phage growth (Fromageot and Zinder), 184; actinomycin D, and transaminase synthesis (Reel and Kenney), 200; actinomycin D and miracil D, in *D. discoideum* (Hirschberg *et al.*), 316; actinomycin D, effect on interferon induction (Field *et al.*), 340; rifamycin, interaction with bacterial RNA polymerase (Wehrli *et al.*), 667; valinomycin, gramicidin D, and amphotericin B, effects on electroplax (Silman and Karlin), 674; streptomycin, and polypeptide synthesis (Modolell and Davis), 1279; streptovaricin, and RNA polymerase mutants (Yura and Igarashi), 1313; polyformycin conformation (Ward and Reich), 1494
Antibody from single cells, electrophoretic analysis (Marchalonis and Nossal), 860
Antibody-forming cells, requirements for (Mosier and Coppleson), 542

Antigen, human transplantation (Kahan *et al.*), 897
Antigenic determinant in human serum lipoprotein (Schultz *et al.*), 963
Antigenic effect of bacterial flagellin in lymphoid system of rat (Ada and Parish), 556
Antithymosin and allograft survival in mice (Hardy *et al.*), 875
Aplysia nerve membrane (Cope), 905
APPELLA, E. *See* Seki, T., 1071
APPLIED BIOLOGY. *See* Table of Contents, p. xi
APPLIED PHYSICAL AND MATHEMATICAL SCIENCES. *See* Table of Contents, p. iv
ARGIOLAS, N. *See* Gandini, E., 945
Argon, shock compression of (Lin *et al.*), 1171
ARNOLD, W., and J. R. AZZI. Chlorophyll Energy Levels and Electron Flow in Photosynthesis, 29
ARNON, D. I. *See* McSwain, B. D., 989
Arousal and "long-term" memory in mice (Barondes and Cohen), 923
ARRHENIUS, G., E. CORENZWIT, R. FITZGERALD, G. W. HULL, JR., H. L. LUO, B. T. MATTHIAS, and W. H. ZACHARIASEN. Superconductivity of $Nb_3(Al, Ge)$ above 20.5° K, 621
Asymptotic distributions of functions of random variables (Robbins *et al.*), 1228
ATTARDI, B. *See* Attardi, G., 261
ATTARDI, G., and B. ATTARDI. Mitochondrial Origin of Membrane-Associated Heterogeneous RNA in HeLa Cells, 261
AUBERT, M., J. F. SCOTT, M. REYNIER, and R. MONIER. Rearrangement of the Conformation of *Escherichia coli* 5*S* RNA, 292
AVERS, C. J., F. E. BILLHEIMER, H.-P. HOFFMANN, and R. M. PAULI. Circularity of Yeast Mitochondrial DNA, 90
Avoidance conditioning and uridine incorporation into mouse brain polysomes (Adair *et al.*), 606
AXELROD, J. *See* Black, I. B., 1287
AZZI, J. R. *See* Arnold, W., 29

Bacillus subtilis, 50*S* ribosomal subunit (Nanninga), 614
Bacteria, multiple circular DNA forms in (Goebel and Helinski), 1406
Bacteriochlorophyll molecules, CD studies (Sauer *et al.*), 17
Bacteriophage (*See* Phage)
BAGLIONI, C. *See* Colombo, B., 651
BALTIMORE, D. *See* Jacobson, M. F., 77
BALTUS, E., J. HANOCQ-QUERTIER, and J. BRACHET. Isolation of Deoxyribonucleic Acid from the Yolk Platelets of *Xenopus laevis* Oöcyte, 469
Banach spaces, nonlinear monotone and accretive operators in (Browder), 388
Banded iron formations, microbiotas of (Cloud and Licari), 779
BARONDES, S. H., and H. D. COHEN. Arousal and the Conversion of "Short-Term" to "Long-Term" Memory, 923
BARTTER, F. C. *See* Wurtman, R. J., 522
Basal bodies in *Paramecium*, development (Dippell), 461
BEACH, F. A., and A. MERARI. Coital Behavior in Dogs, IV. Effects of Progesterone in the Bitch, 442
Behavioral experiences, and uridine in mouse brain (Adair *et al.*), 917
BENESCH, R., R. E. BENESCH, and Y. ENOKI. The Interaction of Hemoglobin and Its Subunits with 2,3-Diphosphoglycerate, 1102
BENESCH, R. E. *See* Benesch, R., 1102
BENNETT, C. *See* Rutishauser, Y., 1414
BENNETT, D. *See* Dunn, L. C., 570
Benzene crystals, intermolecular potential of (Momany *et al.*), 429
BERTLAND, A. U., II, and H. M. KALCKAR. Reversible Changes of Ordered Polypeptide Structures in Oxidized and Reduced Epimerase, 629
BIAS, W. B. *See* Donahue, R. P., 949
"Big insulin" in plasma, immunoassay (Roth *et al.*), 138
Bilirubin, enzymatic conversion from heme (Tenhunen *et al.*), 748
BILLHEIMER, F. E. *See* Avers, C. J., 90
Binding: of mRNA to ribosomes (Grollman and Stewart), 719; of ATP and cyanide in N_2-reducing system (Bui and Mortenson), 1021
Binding protein of uterine cytosol (Korenman and Rao), 1028
Binding sites for estrogen, in intact rat (McGuire and Lisk), 497
BIOCHEMISTRY. *See* Table of Contents, p. vii
Birefringence changes during nerve excitation (Tasaki *et al.*), 883
BLACK, I. B., and J. AXELROD. Regulation of the Daily Rhythm in Tyrosine Transaminase Activity by Environmental Factors, 1287
BLAIR, P. B. *See* Daniel, C. W., 53
BLANCHARD, M. H. *See* Young, M., 1087
BLOCK, R. E. Determination of A^+ for the Simple Flexible Algebras, 394
BLOMQUIST, A. T., D. H. RICH, V. J. HRUBY, L. L. NANGERONI, P. GLOSE, and V. DU VIGNEAUD. Deuterated Oxytocins: The Synthesis and Biological Properties of Three Crystalline Analogs of Deamino-Oxytocin Deuterated in the 1-β-Mercaptopropionic Acid Position, 688
Blood group locus, Duffy, chromosome assignment in man (Donahue *et al.*), 949
Blood group substances, immunochemical studies (Lloyd and Kabat), 1470
Blood, human, correlation between DPG and hemoglobin levels (Eaton and Brewer), 756
BLUNT, J. W., Y. TANAKA, and H. F. DELUCA. The Biological Activity of 25-Hydroxycholecalciferol, a Metabolite of Vitamin D_3, 1503
BOEYENS, J. C. A. *See* Kruger, G. J., 422
BOTANY. See Table of Contents, p. iv
BRAAMS, W. H. *See* Molenaar, I., 982
BRACHET, J. *See* Baltus, E., 469
———. *See* Farber, F. E., 843

Brain function and macromolecules (Adair *et al.*), 606, 917
BREWER, G. J. *See* Eaton, J. W., 756
Brood size of passerine birds, limitation of (Ricklefs), 847
BROWDER, F. E. Nonlinear Monotone and Accretive Operators in Banach Spaces, 388
BROWN, D. *See* Young, M., 1087
BUI, P. T., and L. E. MORTENSON. Mechanism of the Enzymic Reduction of N_2: The Binding of Adenosine 5′-Triphosphate and Cyanide to the N_2-Reducing System, 1021
BURDICK, C. J. *See* Mirsky, A. E., 592
BURNS, J. M. Mating Frequency in Natural Populations of Skippers and Butterflies as Determined by Spermatophore Counts, 852

Calcium flux in rat liver, effect of 3′,5′-AMP (Friedmann and Park), 504
Calcium transfer, effect of vitamin D metabolite on (Blunt *et al.*), 1503
CAMPBELL, A. *See* Adhya, S., 956
CAPE, M. *See* Farber, F. E., 843
CAPRIOLI, R., and D. RITTENBERG. On the Utilization of D-Fructose for Pentose Synthesis in *Escherichia coli*, 1422
Carbohydrate structures of blood group substances (Lloyd and Kabat), 147
Carbonium ion intermediate in lysozyme catalysis (Dahlquist *et al.*), 1194
CARCHMAN, R. *See* Hirschberg, E., 316
CARNAY, L. *See* Tasaki, I., 883
CASKEY, T. *See* Scolnick, E., 768
CASPER, A. *See* Wurtman, R. J., 522
Catch property of ordinary muscle (Wilson and Larimer), 909
CECCARINI, C. *See* Hirschberg, E., 316
Cell(s): fusion of, and SV40 production (Knowles *et al.*), 42; mini-, genetic transfer in (Cohen *et al.*), 61; superinduction of tyrosine transaminase in (Reel and Kenney), 200; tumor, growth inhibition by DNA (Halpern *et al.*), 207; alkali cation absorption across plasmalemma, in plants (Welch and Epstein), 447; myogenic, capacity for differentiation (Yaffe), 477; interactions required for primary immune response (Mosier and Coppleson), 542; mutant human, G6PD in (DeMars), 562; mammalian, ribosomal subunits and protein synthesis in (Colombo *et al.*), 651; antibody-forming (Marchalonis and Nossal), 860; magnesium concentration in (Rose), 1079; transformed, SV40 transcription in (Sauer and Kidwai), 1256; susceptible to transformation, in humans (Todaro and Aaronson), 1272; chemically induced mutations, in mammals (Chu and Malling), 1306; mammalian, N^{15} in DNA and RNA of (Crane and Salzman), 1356
Cell-free system from spleen, miscoding in (Stavy), 347
Cell membranes: and tumor behavior (Wallach), 868; intestinal, and vitamin E (Molenaar *et al.*), 982; lipoprotein from, in rat liver (Widnell and Unkeless), 1050; multiple protein components of (Kiehn and Holland), 1370
Cellular slime mold, effect of antibiotics on (Hirschberg *et al.*), 316
Centrioles in *Paramecium*, development (Dippell), 461
CEPPELLINI, R. *See* Kahan, B. D., 897
Cerebroside tubule structure in Gaucher's disease (Lee), 484
ČERNÁ, J. *See* Monro, R. E., 1042
Chain extension in polypeptides, effect of streptomycin (Modolell and Davis), 1279
Chain models of mouse myeloma γA immunoglobulin molecules (Seki *et al.*), 1071
CHAMBERS, R. W. *See* Schulman, L. H., 308
CHAN, J. P. *See* Ree, F. H., 367
CHAN, Y. M., and J. O. HIRSCHFELDER. Extending the Domain of the Laplacian Operator with the Use of Delta Functions, 1
Characters of group representations (Sally and Shalika), 1231
CHEMISTRY. *See* Table of Contents, p. iii
CHEN, D., S. SARID, and E. KATCHALSKI. The Role of Water Stress in the Inactivation of Messenger RNA of Germinating Wheat Embryos, 1378
Chlamydomonas, cytoplasmic genes in (Sager and Ramanis), 324
Chlorophyll energy levels in photosynthesis (Arnold and Azzi), 29
Cholesterol, effect of polyene macrolide antibiotics (Schaffner and Gordon), 36
Chromatin structure, lysine-rich histones in (Mirsky *et al.*), 592
Chromosome assignment of Duffy blood group locus (Donahue *et al.*), 949
CHU, E. H. Y., and H. V. MALLING. Mammalian Cell Genetics, II. Chemical Induction of Specific Locus Mutations in Chinese Hamster Cells *in vitro*, 1306
Circular dichroism (CD) spectra of photosynthetic bacteria reaction centers (Sauer *et al.*), 17
Circularity of yeast mitochondrial DNA (Avers *et al.*), 90
Citellus tridecemlineatus, secondary hemolysin response in (Jaroslow), 69
CLAYTON, R. K. *See* Zankel, K. L., 1243
CLEARY, P. *See* Adhya, S., 956
Cleavage: polypeptide, in formation of poliovirus proteins (Jacobson and Baltimore), 77; of myosin from action of cyanogen bromide (Young *et al.*), 1087
CLOUD, P. E., JR., and G. R. LICARI. Microbiotas of the Banded Iron Formations, 779
Cluster sets and meromorphic functions (McMillan), 797
COHEN, A., W. D. FISHER, R. CURTISS III, and H. I. ADLER. DNA Isolated from *Escherichia coli* Minicells Mated with F^+ Cells, 61

COHEN, H. D. *See* Barondes, S. H., 923
Coiled-coil α-rope section of myosin molecule (Young *et al.*), 1087
Coital behavior in dogs, effects of hormones on (Beach and Merari), 442
Collagen and elastin cross-linkage (Pinnell and Martin), 708
COLOMBO, B., C. VESCO, and C. BAGLIONI. Role of Ribosomal Subunits in Protein Synthesis in Mammalian Cells, 651
Conformation: of isolated mitochondria (Hackenbrock), 598; of 50*S* ribosomal subunit of *B. subtilis* (Nanninga), 614; of gramicidin S-A (Stern *et al.*), 734; of protein (Kotelchuck and Scheraga), 1163; of tRNA molecules (Cramer *et al.*), 1384; of polyformycin (Ward and Reich), 1494. *See also* Structure
Conformation change(s): of *E. coli* 5*S* RNA (Aubert *et al.*), 292; in spin-labeled hemoglobin (Ogawa *et al.*), 401
Conformation studies with polypeptides (Craig), 152
CONKLIN, K. A. *See* Halpern, R. M., 207
Contraction of muscle, sliding-filament model (Hill), 98; (Hill and White), 514, 889
Control mechanisms (Moscona *et al.*), 160; (Reel and Kenney), 200; (Halpern *et al.*), 207; (Hirschberg *et al.*), 316; (Field *et al.*), 340; (Stavy), 347; (Galston), 454; (McGuire and Lisk), 497; (Kappas *et al.*), 509; (Wurtman *et al.*), 522; (Odell and Swerdloff), 529; (Shows and Ruddle), 574; (Efron and Schwartz), 586; (Colombo *et al.*), 651; (Grollman and Stewart), 719; (Loeb *et al.*), 827; (Ricklefs), 847; (Crouse), 971; (Kolakofsky *et al.*), 1066; (Kulka and Sternlicht), 1123; (Modolell and Davis), 1279; (Black and Axelfod), 1287; (Tonegawa and Hayashi), 1320; (Pastan and Perlman), 1336; (Chen *et al.*), 1378
Control systems, optimality and strong stability (LaSalle and Wan), 375
Conversion of Fe(III) to Fe(II) in ferric halides (Lewis and Drickamer), 414
CONWAY, J. H. A Perfect Group of Order 8,315,553,613,086,720,000 and the Sporadic Simple Groups, 398
COOPER, D. W., and M. R. IRWIN. Glucose-6-Phosphate Dehydrogenase: Evidence for Tetrameric Structure in Doves (*Streptopelia*), 979
COPE, F. W. Evidence for Semiconduction in *Aplysia* Nerve Membrane, 905
COPPLESON, L. W. *See* Mosier, D. E., 542
CORENZWIT, E. *See* Arrhenius, G., 621
Cosmological quantities–elementary particles relationship (Alpher and Gamow), 363
COYNE, L. *See* Sauer, K., 17
CRAIG, L. C. Conformation Studies with Polypeptides by Rotatory Dispersion and Thin-Film Dialysis, 152
———. *See* Stern, A., 734
CRAMER, F., H. DOEPNER, F. V.D. HAAR, E. SCHLIMME, and H. SEIDEL. On the Conformation of Transfer RNA,1384
CRANE, N. A., and N. P. SALZMAN. Density Labeling of Mammalian Cell DNA and RNA with Nitrogen-15, 1356
CROSS, D. R., H. LINSCHITZ, V. KASCHE, and J. TENENBAUM. Low-Temperature Studies on Phytochrome: Light and Dark Reactions in the Red to Far-Red Transformation and New Intermediate Forms of Phytochrome, 1095
Cross-bridge fluctuations in muscle configuration (Hill and White), 514
Cross-linking of collagen and elastin (Pinnell and Martin), 708
CROUSE, H. V. The Role of Ecdysone in DNA-Puff Formation and DNA Synthesis in the Polytene Chromosomes of *Sciara coprophila*, 971
CUATRECASAS, P., M. WILCHEK, and C. B. ANFINSEN. Selective Enzyme Purification by Affinity Chromatography, 636
CUNNINGHAM, B. A. *See* Gottlieb, P. D., 168
———. *See* Rutishauser, U., 1414
CURTISS, R., III. *See* Cohen, A., 61
CURTONI, E. S. *See* Kahan, B. D., 897
Cut points in general topological spaces (Whyburn), 380
Cyanide, binding reactions in N_2-reducing systems (Bui and Mortenson), 1021
Cyanomethemoglobin, NMR studies (Wüthrich *et al.*), 1199
Cytidine 3′-monophosphate (3′-CMP) binding to RNase (Meadows and Jardetzky), 406
Cytoplasmic genes in *Chlamydomonas* (Sager and Ramanis), 324
Cytoplasmic synthesis of adenovirus capsid proteins (Velicer and Ginsberg), 1264
Cytosol binding protein of uterine cytosol (Korenman and Rao), 1028
Cytotoxicity of human lymphocytes (Kolb and Granger), 1250

DAHLQUIST, F. W., T. RAND-MEIER, and M. A. RAFTERY. Demonstration of Carbonium Ion Intermediate during Lysozyme Catalysis, 1194
DANIEL, C. W., K. B. DEOME, J. T. YOUNG, P. B. BLAIR, and L. J. FAULKIN, JR. The *in vivo* Life Span of Normal and Preneoplastic Mouse Mammary Glands: A Serial Transplantation Study, 53
D'APRANO, A., and R. M. FUOSS. Addition Compounds of Water and Phenols, 1183
DARLING, D. A., and H. ROBBINS. Some Nonparametric Sequential Tests with Power One, 804
DAVIDSON, E. H. *See* Mirsky, A. E., 592
DAVIS, B. D. *See* Subramanian, A. R., 761
———. *See* Modolell, J., 1279
DAVIS, E. *See* Watson, C. J., 223
Deacylated tRNA, release from ribosomes (Kuriki and Kaji), 1399
Deamino-oxytocin, synthesis of three crystalline deuterated analogs (Blomquist *et al.*), 688

DECROLY, M. *See* Farber, F. E., 843
Deficiency of G6PD, multiple tissue studies (Gandini *et al.*), 945
Degeneracy of amino acid code (Mitchell), 742
Deletion analysis of prophage λ (Adhya *et al.*), 956
DELL'ACQUA, G. *See* Gandini, E., 945
Delta functions in electrostatics and in quantum mechanics (Chan and Hirschfelder), 1
DELUCA, H. F. *See* Blunt, J. W., 1503
DEMARS, R. A Temperature-Sensitive Glucose-6-Phosphate Dehydrogenase in Mutant Cultured Human Cells, 562
Density labeling of DNA and RNA with N^{15} (Crane and Salzman), 1356
DEOME, K. B. *See* Daniel, C. W., 53
DETROY, R. W., D. F. WITZ, R. A. PAREJKO, and P. W. WILSON. Reduction of N_2 by Complementary Functioning of Two Components from Nitrogen-Fixing Bacteria, 537
Deuterated oxytocins (Blomquist *et al.*), 688
DEWEY, K. F. *See* Kolakofsky, D., 1066
Dictyostelium discoideum, effect of synthesis inhibitors on growth and aggregation of (Hirschberg *et al.*), 316
Differentiation potentialities of myogenic cells (Yaffe), 477
2,3-Diphosphoglycerate (DPG): and human hemoglobin levels (Eaton and Brewer), 756; interaction with hemoglobin (Benesch *et al.*), 1102
Diphtheria toxin and NDA, effect on GTPase activity (Raeburn *et al.*), 1428
DIPPELL, R. V. The Development of Basal Bodies in *Paramecium*, 461
Discontinuous synthesis of DNA during replication (Yudelevich *et al.*), 1129
Disease resistance in maize (Saxena and Hooker), 1300
Dissociation factor in ribosome-polysome cycle (Subramanian *et al.*), 761
Distortions, genetically controlled, in mouse gametes (Dunn and Bennett), 570
Diurnal rhythm of enzyme activity, in rat (Black and Axelrod), 1287
DNA: from *E. coli* minicells mated with F^+ cells (Cohen *et al.*), 61; inhibitory effect on neoplastic cell growth (Halpern *et al.*), 207; from yolk platelets of *X. laevis* (Baltus *et al.*), 469; density labeling with N^{15} (Crane and Salzman), 1356; circular forms in bacteria (Goebel and Helinski), 1406
DNA, cytoplasmic, in *Chlamydomonas* (Sager and Ramanis), 324
DNA, mitochondrial: circularity of (Avers *et al.*), 90; polymerase (Meyer and Simpson), 130; of *P. vulgaris* (Wolstenholme and Gross), 245
DNA, phage λ, transcription by b_2 region (Tonegawa and Hayashi), 1320
DNA, ribosomal, dosage regulation, in *D. melanogaster* (Keifer), 85
DNA, transforming: UV-resistant in *M. radiodurans* (Moseley and Setlow), 176; *in vitro* synthesis of (Ganesan), 1058
DNA-adenylate intermediate in polynucleotide-joining reaction (Olivera *et al.*), 237
DNA polymerase, in repair of short DNA duplexes (Gupta and Khorana), 215; in human lymphocytes (Loeb *et al.*), 827
DNA puffs in *S. coprophila* (Crouse), 971
DNA replication (*See* Replication)
DNA–RNA complexes (Hayashi and Hayashi) 1107
DNA synthesis: in rat liver mitochondria (Meyer and Simpson), 130; oligodeoxynucleotides in (Goulian), 284; and DNA puffs in *S. coprophila* (Crouse), 971; by T4 mutant (Hosoda and Mathews), 997; from *B. subtilis* polymerase complex (Ganesan), 1058; by discontinuous growth (Yudelevich *et al.*), 1129; and phage T4 mutants (Masamune and Richardson), 1328
DOEPNER, H. *See* Cramer, F., 1384
Dogs, coital behavior affected by hormones (Beach and Merari), 442
DONAHUE, R. P., W. B. BIAS, J. H. RENWICK, and V. A. MCKUSICK. Probable Assignment of the Duffy Blood Group Locus to Chromosome 1 in Man, 949
Dosage regulation of ribosomal DNA in *D. melanogaster* (Kiefer), 85
Double-stranded DNA from yolk platelets of *X. laevis* (Baltus *et al.*), 469
DRATZ, E. A. *See* Sauer, K., 17
DREIZEN, P. *See* Trotta, P. P., 659
DRICKAMER, H. G. *See* Lewis, G. K., Jr., 414
———. *See* Fung, S. C., 812
———. *See* Grenoble, D. C., 1177
Drosophila ananassae, enzyme variability in (Gillespie and Kojima), 582
Drosophila melanogaster, ribosomal DNA in (Keifer), 85
Drugs, effect on memory, in mice (Barondes and Cohen), 923
DU VIGNEAUD, V. *See* Blomquist, A. T., 688
Duffy blood group locus, chromosome assignment in man (Donahue *et al.*), 949
DUNN, L. C., and D. BENNETT. A New Case of Transmission Ratio Distortion in the House Mouse, 570

Ear of lizard, effect of sound in (Wever), 1292
Early synthesis of λ mRNA (Kourilsky *et al.*), 1013
EATON, J. W., and G. J. BREWER. The Relationship between Red Cell 2,3-Diphosphoglycerate and Levels of Hemoglobin in the Human, 756
Ecdysone, effect on DNA synthesis and puff formation, in *S. coprophila* (Crouse), 971
Ecology, human, crises in (Harrar), 357
EDELMAN, G. M. *See* Gottlieb, P. D., 168
———. *See* Lindahl, T., 680
———. *See* Rutishauser, U., 1414
EFRON, Y., and D. SCHWARTZ. *In vivo* Inactivation of Maize Alcohol Dehydrogenase by a Two-Factor System, 586
EILENBERG, S., and C. C. ELGOT. Iteration and Recursion, 378

Elastin and collagen cross-linkage (Pinnell and Martin), 708
Electron flow in photosynthesis (Arnold and Azzi), 29
Electrophoretic analysis of antibody produced by single cells (Marchalonis and Nossal), 860
Electroplax, effects of antibiotics on (Silman and Karlin), 674
Electrostatic problems, delta functions in (Chan and Hirschfelder), 1
Elementary particles, possible relation with cosmological quantities (Alpher and Gamow), 363
ELGOT, C. C. *See* Eilenberg, S., 378
ELSON, D. *See* Vogel, Z., 701
Encephalomyelitis, allergic, structural basis for induction (Eylar and Hashim), 644
Energy conversion and biosynthesis in *Rps. capsulata* (Sojka and Gest), 1486
Energy levels of chlorophyll (Arnold and Azzi), 29
Energy-producing enzymes in *D. ananassae* (Gillespie and Kojima), 582
Energy states of isolated rat liver mitochondria (Hackenbrock), 598
Energy transfer reactions of oxidative phosphorylation (Sanadi *et al.*), 277
Enhancement effects in photosynthesis (McSwain and Arnon), 989
ENOKI, Y. *See* Benesch, R., 1102
Environmental factors, effect on enzyme activity rhythm, in rat (Black and Axelrod), 1287
Enzymatic breakage and joining of DNA (Masamune and Richardson), 1328
Enzymatic conversion: of peptide-bound lysine (Pinnell and Martin), 708; of heme to bilirubin (Tenhunen *et al.*), 748
Enzymatic joining of polynucleotides (Olivera *et al.*), 237
Enzymatic pathway for synthesis of Gln-tRNA (Wilcox and Nirenberg), 229
Enzymatic recognition of serine tRNA (Sundharadas *et al.*), 693
Enzymatic reduction of nitrogen (Bui and Mortenson), 1021
Enzymatic repair: of short DNA duplexes (Gupta and Khorana), 215; by polynucleotide ligase (Lindahl and Edelman), 680
Enzyme(s): induction in embryonic retina (Moscona *et al.*), 160; synthesis and degradation, effect of actinomycin D (Reel and Kenney), 200; in *Neurospora* mitochondria (Gross *et al.*), 253; structure and binding sites (Meadows and Jardetzky), 406; variability of, in *D. ananassae* (Gillespie and Kojima), 582; purification of, by affinity chromatography (Cuatrecasas *et al.*), 636; hydrolyzing N-substituted aminoacyl-tRNA (Vogel *et al.*), 701; variants of, inherited in doves (Cooper and Irwin), 979; secretion of, in mouse pancreas (Kulka and Sternlicht), 1123; catalysis of, transition state in (Dahlquist *et al.*), 1194; catalyzing virus-specific RNA (Shatkin and Sipe), 1462
Enzyme activity: rhythm, in rat (Black and Axelrod), 1287; inhibition by diphtheria toxin and NAD (Raeburn *et al.*), 1428
Enzyme-catalyzed reaction in protein synthesis (Monro *et al.*), 1042
Enzyme-protein interactions (Schechter *et al.*) 1478
Enzyme reaction mechanism (Evans and Wood), 1448
Epimerase, reversible changes of ordered polypeptide structures in (Bertland and Kalckar), 629
Epinephrine, impaired secretion in hypophysectomized dogs (Wurtman *et al.*), 522
EPSTEIN, E. *See* Welch, R. M., 447
Equilibrium constant of adenylate kinase, and magnesium in cells (Rose), 1079
Eremias argus, hearing mechanism of (Wever), 1292
Erythrocyte: LDH phenotypes, in mouse (Shows and Ruddle), 574; membrane proteins, in beef (Mazia and Ruby), 1005
Escherichia coli: DNA in minicells of (Cohen *et al.*), 61; RNA phage growth in presence of rifampicin (Fromageot and Zinder), 184; 5*S* RNA, conformation change in (Aubert *et al.*), 292; ribosome dissociation in (Subramanian *et al.*), 761; RNA polymerase mutants of (Yura and Igarashi), 1313; DNA synthesis in absence of ligase (Masamune and Richardson), 1328; metabolism of D-fructose in (Caprioli and Rittenberg), 1422; equilibrium between two LPS fractions (Levy and Leive), 1435
Estradiol binding protein of uterine cytosol (Korenman and Rao), 1028
Estrogen and progesterone, effect on coital behavior in dogs (Beach and Merari), 442
Estrogen receptors, time course in intact rat (McGuire and Lisk), 497
EVANS, H. J., and H. G. WOOD. The Mechanism of the Pyruvate, Phosphate Dikinase Reaction, 1448
EWING, M., and F. MOUZO. Ocean Bottom Photographs in the Area of the Oldest Known Outcrops, North Atlantic Ocean, 787
Excitable membranes: of nerve and muscle (Hubbell and McConnell), 12; ion movements across (Nachmansohn), 1034
Excitation in nerve tissue, optical changes during (Tasaki *et al.*), 883
EYLAR, E. H., and G. A. HASHIM. Allergic Encephalomyelitis: The Structure of the Encephalitogenic Determinant, 644
EYRING, H. *See* Lin, S. H., 1171

Factor: for ribosome dissociation in *E. coli* (Subramanian *et al.*), 761; release, and terminator codon translation (Scolnick *et al.*), 768
Factor B in energy transfer reactions of oxidative phosphorylation (Sanadi *et al.*), 277
Factor f_2 and GTPase activity (Kolakofsky *et al.*), 1066
Factor G in protein synthesis (Pestka), 726

FARBER, F. E., M. CAPE, M. DECROLY, and J. BRACHET. The *in vitro* Translation of *Acetabularia mediterranea* RNA, 843
FAULKIN, L. J., JR. *See* Daniel, C. W., 53
Fe(III), conversion to Fe(II) in ferric halides (Lewis and Drickamer), 414
FELLER, W. On Probabilities of Large Deviations, 1224
FIELD, A. K., A. A. TYTELL, G. P. LAMPSON, and M. R. HILLEMAN. Inducers of Interferon and Host Resistance, V. *In vitro* Studies, 340
Fine structure of cerebroside in Gaucher's disease (Lee), 484
FISHER, W. D. *See* Cohen, A., 61
FITZGERALD, R. *See* Arrhenius, G., 621
FIX, G. Orders of Convergence of the Rayleigh-Ritz and Weinstein-Bazley Methods, 1219
Fixation of isolated mitochondria (Hackenbrock), 598
Fixed points, simplicial approximation of (Kuhn), 1238
Flagellin, bacterial, immunogenic effect in rat (Ada and Parish), 556
Flexible algebras (Block), 394
Fluorescence: changes during nerve excitation (Tasaki *et al.*), 883; from photosynthetic bacteria (Zankel *et al.*), 1243
Focus formation by human adenovirus 12 in human cell strains (Todaro and Aaronson), 1272
FOFT, J. W. *See* Weiss, S. B., 114
"Food-limited" hypothesis of reproductive rates (Ricklefs), 847
Force-velocity curves (Hill and White), 889
Formycin polymers, conformation of (Ward and Reich), 1494
FOWLER, C. F. *See* Sybesma, C., 1343
FRIEDMANN, N., and C. R. PARK. Early Effects of 3′,5′-Adenosine Monophosphate on the Fluxes of Calcium and Potassium in the Perfused Liver of Normal and Adrenalectomized Rats, 504
FROMAGEOT, H. P. M., and N. D. ZINDER. Growth of Bacteriophage f2 in *E. coli* Treated with Rifampicin, 184
D-Fructose in pentose synthesis, in *E. coli* (Caprioli and Rittenberg), 1422
D-Fructose 1-phosphate, phosphoenolpyruvate-dependent phosphorylation of (Hanson and Anderson), 269
FUNG, S. C., G. K. LEWIS, JR., and H. G. DRICKAMER. The Effect of Pressure on the Oxidation State of Iron, II. Oxygen Ligands, 812
FUOSS, R. M. *See* Lietzke, M. H., 775
———. *See* D'Aprano, A., 1183
Fusion between different SV40-transformed cells (Knowles *et al.*), 42

β-Galactosidase, *lac* promotor in synthesis of (Pastan and Perlman), 1336
GALSTON, A. W. Microspectrophotometric Evidence for Phytochrome in Plant Nuclei, 454
Gamma globulin immunoglobulin: heavy and light polypeptide chains of (Gottlieb *et al.*), 168; amino acid sequence in (Rutishauser *et al.*), 1414
GAMOW, G. *See* Alpher, R. A., 363
GANDINI, E., S. M. GARTLER, G. ANGIONI, N. ARGIOLAS, and G. DELL'ACQUA. Developmental Implications of Multiple Tissue Studies in Glucose-6-Phosphate Dehydrogenase-Deficient Heterozygotes, 945
GANESAN, A. T. Studies on the *in vitro* Synthesis of Transforming DNA, 1058
GARTLER, S. M. *See* Gandini, E., 945
Gaseous and liquid metals, correspondence of (Ree and Chan), 367
GASIC, G. J., T. B. GASIC, and C. C. STEWART. Antimetastatic Effects Associated with Platelet Reduction, 46
GASIC, T. B. *See* Gasic, G. J., 46
Gaucher's disease, tubule structure in (Lee), 484
Gene: involvement in enzyme production (Gross *et al.*), 253; duplication in α-chain polypeptides of mouse hemoglobins (Hilse and Popp), 930; sequence in *S. aureus* protoheme synthesis (Tien and White), 1392
Genetic analysis of cytoplasmic systems (Sager and Ramanis), 324
Genetic code degeneracy, role in protein synthesis (Mitchell), 742
Genetic polymorphism studies of G6PD (Gandini *et al.*), 945
Genetic resistance to rust, in maize (Saxena and Hooker), 1300
Genetic transfer in *E. coli* minicells (Cohen *et al.*), 61
Genetic variability in yeast populations (Wills), 937
Genetically controlled distortions in mouse gametes (Dunn and Bennett), 570
GENETICS. *See* Table of Contents, p. xi
Genome of SV40 mRNA, transcription of (Sauer and Kidwai), 1256
GEOLOGY. *See* Table of Contents, p. iv
GEOPHYSICS. *See* Table of Contents, p. iv
Germanium alloy, superconductivity above 20.5°K (Arrhenius *et al.*), 621
GEST, H. *See* Sojka, G. A., 1486
GIBBONS, W. A. *See* Stern, A., 734
GILL, T. J., III, and H. W. KUNZ. The Immunogenicity of Vinyl Polymers, 490
GILLESPIE, J. H., and K. KOJIMA. The Degree of Polymorphisms in Enzymes Involved in Energy Production Compared to That in Nonspecific Enyzmes in Two *Drosophila ananassae* Populations, 582
GILMORE, E. B. *See* Gross, S. R., 253
GINSBERG, B. *See* Yudelevich, A., 1129
GINSBERG, H. S. *See* Velicer, L. F., 1264
GLASSMAN, E. *See* Adair, L. B., 606; 917
GLOSE, P. *See* Blomquist, A. T., 688
Glucose-6-phosphate dehydrogenase (G6PD): temperature-sensitive, in mutant human fibroblasts (DeMars), 562; deficiency in multiple tissue studies (Gandini *et al.*), 945; structure, in doves (Cooper and Irwin), 979

Glutamine synthetase activity in retina (Moscona *et al.*), 160
Glutamine tRNA (Gln-tRNA), as cofactor in synthesis of glutamine (Wilcox and Nirenberg), 229
GOEBEL, W., and D. R. HELINSKI. Generation of Higher Multiple Circular DNA Forms in Bacteria, 1406
GOLDMAN, D. S. *See* Worcel, A., 122
GOLDSTEIN, A. L. *See* Hardy, M. A., 875
GOOR, R. S. *See* Raeburn, S., 1428
GORDEN, P. *See* Roth, J., 138
GORDON, H. W. *See* Schaffner, C. P., 36
GOTTLIEB, P. D., B. A. CUNNINGHAM, M. J. WAXDAL, W. H. KONIGSBERG, and G. M. EDELMAN. Variable Regions of Heavy and Light Polypeptide Chains of the Same γG-Immunoglobulin Molecule, 168
GOULIAN, M. Incorporation of Oligodeoxynucleotides into DNA, 284
Gramicidin D, effects on electroplax (Silman and Karlin), 674
Gramicidin S-A, conformation (Stern *et al.*), 734
GRANGER, G. A. *See* Kolb, W. P., 1250
GRANICK, S. *See* Kappas, A., 509
GRENOBLE, D. C., and H. G. DRICKAMER. The Effect of Pressure on the Oxidation State of Iron, III. Hemin and Hematin, 1177
GRIFFITH, O. H. *See* Keith, A. D., 819
GROLLMAN, A. P., and M. L. STEWART. Inhibition of the Attachment of Messenger Ribonucleic Acid to Ribosomes, 719
GROS, F. *See* Kourilsky, P., 1013
GROSS, N. J. *See* Wolstenholme, D. R., 245
GROSS, S. R., M. T. MCCOY, and E. B. GILMORE. Evidence for the Involvement of a Nuclear Gene in the Production of the Mitochondrial Leucyl-tRNA Synthetase of *Neurospora*, 253
Group representations, characters of (Sally and Shalika), 1231
Groups, perfect (Conway), 398
Guanosine phosphate: GTPase activity of initiation factor f_2 (Kolakofsky *et al.*), 1066; GTP and release of tRNA from ribosomes (Kuriki and Kaji), 1399; GTP interaction with aminoacyl transferase II (Raeburn *et al.*), 1428
GUPTA, N. K., and H. G. KHORANA. Studies on Polynucleotides, XC. DNA Polymerase-Catalyzed Repair of Short DNA Duplexes with Single-Stranded Ends, 215

HAAR, F. V.D. *See* Cramer, F., 1384
HACKENBROCK, C. R. Chemical and Physical Fixation of Isolated Mitochondria in Low-Energy and High-Energy States, 598
HAENNI, A. L., and J. LUCAS-LENARD. Stepwise Synthesis of a Tripeptide, 1363
HALL, Z. W. *See* Olivera, B. M., 237
HALPERN, B. C. *See* Halpern, R. M., 207
HALPERN, R. M., B. C. HALPERN, K. A. CONKLIN, and R. A. SMITH. Inhibition of Neoplastic Cell Growth by Autogenous DNA, 207
HANOCQ-QUERTIER, J. *See* Baltus, E., 469
HANSON, T. E., and R. L. ANDERSON. Phosphoenolpyruvate-Dependent Formation of D-Fructose 1-Phosphate by a Four-Component Phosphotransferase System, 269
HARDY, M. A., J. QUINT, A. L. GOLDSTEIN, D. STATE, and A. WHITE. Effect of Thymosin and an Antithymosin Serum on Allograft Survival in Mice, 875
HARRAR, J. G. Crises in Human Ecology, 357
HARVIE, N. R. *See* Schultz, J. S., 963
HASHIM, G. A. *See* Eylar, E. H., 644
HAXBY, J. A., C. B. KINSKY, and S. C. KINSKY. Immune Response of a Liposomal Model Membrane, 300
HAYASHI, M. *See* Hayashi, M. N., 1107
———. *See* Tonegawa, S., 1320
HAYASHI, M. N., and M. HAYASHI. The Stability of Native DNA-RNA Complexes during *in vivo* ΦX-174 Transcription, 1107
Hearing in lizards (Wever), 1292
Heavy and light polypeptide chains of γG immunoglobulin (Gottlieb *et al.*), 168
HeLa cells, mitochondrial RNA in (Attardi and Attardi), 261
HELINSKI, D. R. *See* Goebel, W., 1406
Hematin, Mössbauer resonance studies (Grenoble and Drickamer), 1177
Heme: enzymatic conversion to bilirubin (Tenhunen *et al.*), 748; interaction in hemoglobin (Minton and Libby), 1191. *See also* Protoheme
Hemin, Mössbauer resonance studies (Grenoble and Drickamer), 1177
Hemoglobin: spin-labeled, conformation changes in (Ogawa *et al.*), 401; levels of, and DPG, in humans (Eaton and Brewer), 756; polypeptides of, amino acid ambiguity in (Hilse and Popp), 930; interaction with DPG (Benesch *et al.*), 1102
Hemolysin response in hibernating squirrels (Jaroslow), 69
HERSHEY, J. W. B. *See* Kolakofsky, D., 1066
Heterozygotes for G6PD deficiency (Gandini *et al.*), 945
Hibernating ground squirrel, secondary hemolysin response in (Jaroslow), 69
Hilbert transform, inequality for (Redheffer), 810
HILL, T. L. On the Sliding-Filament Model of Muscular Contraction, II, 98
——— and G. M. WHITE. On the Sliding-Filament Model of Muscular Contraction, III. Kinetics of Cross-Bridge Fluctuations in Configuration, 514
——— and G. M. WHITE. On the Sliding-Filament Model of Muscular Contraction, IV. Calculation of Force-Velocity Curves, 889
HILLEMAN, M. R. *See* Field, A. K., 340
HILSE, K., and R. A. POPP. Gene Duplication as the Basis for Amino Acid Ambiguity in the Alpha-Chain Polypeptides of Mouse Hemoglobins, 930

HIRSCHBERG, E., C. CECCARINI, M. OSNOS, and R. CARCHMAN. Effects of Inhibitors of Nucleic Acid and Protein Synthesis on Growth and Aggregation of the Cellular Slime Mold *Dictyostelium discoideum*, 316
HIRSCHFELDER, J. O. *See* Chan, Y. M., 1
Histidine 64 in active site of subtilisin (Markland *et al.*), 1440
Histones, lysine-rich, in chromatin structure (Mirsky *et al.*), 592
HOFFMANN, H. P. *See* Avers, C. J., 90
HOLLAND, J. J. *See* Kiehn, E. D., 1370
HOMMES, F. A. *See* Molenaar, I., 982
HOOKER, A. L. *See* Saxena, K. M. S., 1300
Hormone receptors, degeneration in long-term absence of estradiol (McGuire and Lisk), 497
Hormone surge, progestogen-induced, in women (Odell and Swerdloff), 529
HORWITZ, A. *See* Ogawa, S., 401
HOSODA, J., and E. MATHEWS. DNA Replication *in vivo* by a Temperature-Sensitive Polynucleotide Ligase Mutant of T4, 997
Host resistance, inducers of (Field *et al.*), 340
HOYER, B. H. *See* Young, N. A., 548
HRUBY, V. J. *See* Blomquist, A. T., 688
HSU, W. T. *See* Weiss, S. B., 114
HUANG, W. M. *See* Pitha, P. M., 332
HUBBELL, W. L., and H. M. MCCONNELL. Spin-Label Studies of the Excitable Membranes of Nerve and Muscle, 12
HULL, G. W., JR. *See* Arrhenius, G., 621
Human environment, threats to (Harrar), 357
Human serum lipoprotein carrying Lp antigenic determinant (Schultz *et al.*), 963
Human transplantation antigen (Kahan *et al.*), 897
HURWITZ, J. *See* Yudelevich, A., 1129
Hybridization, DNA-tRNA (Weiss *et al.*), 114
Hydrogen exchange in staphylococcal nuclease (Schechter *et al.*), 1478
25-Hydroxycholecalciferol (Blunt *et al.*), 1503
Hysteresis of muscle response (Wilson and Larimer), 909

IGARASHI, K. *See* Yura, T., 1313
Immune response: cell interactions required for (Mosier and Coppleson), 542; of a liposomal model membrane (Haxby *et al.*), 300
Immunoassay of "big insulin" in plasma (Roth *et al.*), 138
Immunochemical data: on nerve growth factor (Zanini *et al.*), 835; on blood group substances (Lloyd and Kabat), 1470
Immunogenic activity of vinyl polymers (Gill and Kunz), 490
Immunoglobulin, γA, of mouse myeloma (Seki *et al.*), 1071
Immunoglobulin, γG, amino acid sequence of (Gottlieb *et al.*), 168; (Rutishauser *et al.*), 1414
Immunosuppressive effect of thymosin and its antiserum (Hardy *et al.*), 875
Induction of ALA-synthetase by steroids (Kappas *et al.*), 509
Inheritance of capacity to differentiate, in muscle cells (Yaffe), 477
Inhibition of neoplastic cell growth by DNA (Halpern *et al.*), 207
Insulin: component in plasma, immunoassay of (Roth *et al.*), 138; and secretion of epinephrine, in dogs (Wurtman *et al.*), 522
Interaction between hemes in hemoglobin (Minton and Libby), 1191
Interferon inducers and host resistance (Field *et al.*), 340
Intermolecular potentials from crystal data (Momany *et al.*), 429
Intersystem crossing, and temperature (Meyer *et al.*), 7
Intestinal cell membranes and vitamin E (Molenaar *et al.*), 982
Intramolecular acyl migration in adenosine derivatives (Neumann *et al.*), 1207
Ion exchange in plant cells (Welch and Epstein), 447
Ion movements across excitable membranes (Nachmansohn), 1034
Iron oxidation, pressure effect on (Fung *et al.*), 812; (Grenoble and Drickamer), 1177
IRWIN, M. R. *See* Cooper, D. W., 979
Iteration and recursion (Eilenberg and Elgot), 378
ITANO, H. A. *See* Seki, T., 1071

JACOBSON, M. F., and D. BALTIMORE. Polypeptide Cleavages in the Formation of Poliovirus Proteins, 77
JARDETZKY, O. *See* Meadows, D. H., 406
JAROSLOW, B. N. Development of the Secondary Hemolysin Response in Hibernating Ground Squirrels (*Citellus tridecemlineatus*), 69
JENSEN, F. C. *See* Knowles, B. B., 42
JOHNSON, S. C. *See* Julesz, B., 437
Joining of polynucleotides (Olivera *et al.*), 237
JULESZ, N., and S. C. JOHNSON. Stereograms Portraying Ambiguously Perceivable Surfaces, 437

KABAT, E. A. *See* Lloyd, K. O., 1470
KAEMPFER, R. Ribosomal Subunit Exchange during Protein Synthesis, 106
KAHAN, B. D., R. A. REISFELD, M. A. PELLEGRINO, E. S. CURTONI, P. L. MATTIUZ, and R. CEPPELLINI. Water-Soluble Human Transplantation Antigen, 897
KAJI, A. *See* Kuriki, Y., 1399
KALCKAR, H. M. *See* Bertland, A. U., II, 629
KAO, F. T., and T. T. PUCK. Genetics of Somatic Mammalian Cells, VII. Induction and Isolation of Nutritional Mutants in Chinese Hamster Cells, 775 (erratum)
KAPPAS, A., C. S. SONG, R. D. LEVERE, R. A. SACHSON, and S. GRANICK. The Induction of δ-Aminolevulinic Acid Synthetase *in vivo* in Chick Embryo Liver by Natural Steroids, 509
KARLIN, A. *See* Silman, H. I., 674, 1502
KASCHE, V. *See* Cross, D. R., 1095
KATCHALSKI, E. *See* Chen, D., 1378

KATZE, J. R. *See* Sundharadas, G., 693
KEITH, A. D., A. S. WAGGONER, and O. H. GRIFFITH. Spin-Labeled Mitochondrial Lipids in *Neurospora crassa*, 819
KELLER, E. B. *See* Loehr, J. S., 1115
KENNEY, F. T. *See* Reel, J. R., 200
KHORANA, H. G. *See* Gupta, N. K., 215
KIDWAI, J. R. *See* Sauer, G., 1256
KIEFER, B. I. Dosage Regulation of Ribosomal DNA in *Drosophila melanogaster*, 85
KIEHN, E. D., and J. J. HOLLAND. Multiple Protein Components of Mammalian Cell Membranes, 1370
KINSKY, C. B. *See* Haxby, J. A., 300
KINSKY, S. C. *See* Haxby, J. A., 300
KLEM, E. B., and T. NAKAMOTO. The Initiation of Polyphenylalanine Synthesis with N-Acetylphenylalanyl-tRNA, 1349
KNOWLES, B. B., F. C. JENSEN, Z. STEPLEWSKI, and H. KOPROWSKI. Rescue of Infectious SV40 after Fusion between Different SV40-Transformed Cells, 42
KNÜSEL, F. *See* Wehrli, W., 667
KOJIMA, K. *See* Gillespie, J. H., 582
KOLAKOFSKY, D., K. F. DEWEY, J. W. B. HERSHEY, and R. E. THACH. Guanosine 5′-Triphosphatase Activity of Initiation Factor f_2, 1066
KOLB, W. P., and G. A. GRANGER. Lymphocyte *in vitro* Cytotoxicity: Characterization of Human Lymphotoxin, 1250
KONIGSBERG, W. *See* Sundharadas, G., 693
KONIGSBERG, W. H. *See* Gottlieb, P. D., 168
———. *See* Rutishauser, U., 1414
KOPROWSKI, H. *See* Knowles, B. B., 42
KORENMAN, S. G., and B. R. RAO. Reversible Disaggregation of the Cytosol-Estrogen Binding Protein of Uterine Cytosol, 1028
KOTELCHUCK, D., and H. A. SCHERAGA. The Influence of Short-Range Interactions on Protein Conformation, I. Side Chain–Backbone Interactions within a Single Peptide Unit, 1163
KOURILSKY, P., L. MARCAUD, P. SHELDRICK, D. LUZZATI, and F. GROS. Studies on the Messenger RNA of Bacteriophage λ, I. Various Species Synthesized Early after Induction of the Prophage, 1013
KRUGER, G. J., and J. C. A. BOEYENS. The Crystal and Molecular Structure of the Potassium Salt of 2,2,5,5-Tetramethyl-3-Carboxypyrroline-1-Oxyl, 422
KUHN, H. W. Simplicial Approximation of Fixed Points, 1238
KULKA, R. G., and E. STERNLICHT. Enzyme Secretion in Mouse Pancreas Mediated by Adenosine-3′5′-Cyclic Phosphate and Inhibited by Adenosine-3′-Phosphate, 1123
KUNZ, H. W. *See* Gill, T. J., III, 490
KURIKI, Y., and A. KAJI. Factor- and Guanosine 5′-Triphosphate-Dependent Release of Deacylated Transfer RNA from 70*S* Ribosomes, 1399
KURUP, C. K. R. *See* Sanadi, D. R., 277
Lac promotor in β-galactosidase synthesis (Pastan and Perlman), 1336
Lacertidae, hearing mechanism of (Wever), 1292
Lactate dehydrogenase (LDH) *B* gene in mouse erythrocytes (Shows and Ruddle), 574
LAM, K. W. *See* Sanadi, D. R., 277
LAMPSON, G. P. *See* Field, A. K., 340
Laplacian operator, delta functions in (Chan and Hirschfelder), 1
LARIMER, J. L. *See* Wilson, D. M., 909
LASALLE, J. P., and S. WAN. Optimality and Strong Stability of Control Systems, 375
LEE, R. E. The Fine Structure of the Cerebroside Occurring in Gaucher's Disease, 484
LEHMAN, I. R. *See* Olivera, B. M., 237
LEIVE, L. *See* Levy, S. B., 1435
LENGYEL, P. *See* Sundharadas, G., 693
Lepidoptera populations, mating frequency (Burns), 852
LEVERE, R. D. *See* Kappas, A., 509
LEVI-MONTALCINI, R. *See* Zanini, A., 835
LEVY, S. B., and L. LEIVE. An Equilibrium between Two Fractions of Lipopolysaccharide in *Escherichia coli*, 1435
LEWIS, G. K., JR., and H. G. DRICKAMER. High-Pressure Mössbauer Resonance Studies of the Conversion of Fe(III) to Fe(II) in Ferric Halides, 414
———. *See* Fung, S. C., 812
LIBBY, W. F. *See* Minton, A., 1191
LICARI, G. R. *See* Cloud, P. E., 779
LIETZKE, M. H., R. W. STOUGHTON, and R. M. FUOSS. A Two-Structure Model for Electrolytic Solutions, 775 (erratum)
Ligands, interactions with proteins in staphylococcal nuclease (Schechter *et al.*), 1478
Ligase activity in myeloid and lymphoid tissues (Lindahl and Edelman), 680
Light-driven reactions in *R. rubrum* (Sybesma and Fowler), 1343
LIGHTNER, D. A. *See* Watson, C. J., 223
LIN, S. H., D. TWEED, and H. EYRING. The Significant Structure Theory of Liquids Applied to the Shock Compression of Argon, 1171
LINDAHL, T., and G. M. EDELMAN. Polynucleotide Ligase from Myeloid and Lymphoid Tissues, 680
Linear DNA from yolk platelets of *X. laevis* (Baltus *et al.*), 469
LINSCHITZ, H. *See* Cross, D. R., 1095
Lipopolysaccharide (LPS) fractions in *E. coli* (Levy and Leive), 1435
Lipoprotein human antigenic determinant in (Schultz *et al.*), 963; from rat liver membrane cells (Widnell and Unkeless), 1050
Liposomal model membrane, immune response of (Haxby *et al.*), 300
Liquid and gaseous metals, correspondence of (Ree and Chan), 367
Liquids, significant structure theory (Lin *et al.*), 1171
LISK, R. D. *See* McGuire, J. L., 497
LITTAU, V. C. *See* Mirsky, A. E., 592

Liver, effect of steroids on enzymatic activity (Kappas *et al.*), 509
LLOYD, K. O., and E. A. KABAT. Immunochemical Studies on Blood Groups, XLI. Proposed Structures for the Carbohydrate Portions of Blood Group A, B, H, Lewis^a, and Lewis^b Substances, 1470
LOEB, L. A., S. S. AGARWAL, and A. M. WOODSIDE. Induction of DNA Polymerase in Human Lymphocytes by Phytohemagglutinin, 827
LOEHR, J. S., and E. B. KELLER. Dimers of Alanine Transfer RNA with Acceptor Activity, 1115
London force interactions between hemes in hemoglobin (Minton and Libby), 1191
LUBIN, M. Observations on the Shape of the 50*S* Ribosomal Subunit, 1454
LUCAS-LENARD, J. *See* Haenni, A. L., 1363
LUO, H. L. *See* Arrhenius, G., 621
Luteinizing and follicle-stimulating hormone surge induced by progestogen, in women (Odell and Swerdloff), 529
LUZZATI, D. *See* Kourilsky, P., 1013
Lymphocyte, human, and DNA polymerase induction (Loeb *et al.*), 827
Lymphocyte-flagellin reaction in rat (Ada and Parish), 556
Lymphotoxin, human (Kolb and Granger), 1250
Lysine-rich histones in chromatin structure (Mirsky *et al.*), 592
Lysozyme: short-range interactions on conformation of (Kotelchuck and Scheraga), 1163; carbonium ion intermediate in catalysis of (Dahlquist *et al.*), 1194

MCCONNELL, H. M. *See* Hubbell, W. L., 12
———. *See* Ogawa, S., 401
MCCOY, M. T. *See* Gross, S. R., 253
MCGUIRE, J. L., and R. D. LISK. Estrogen Receptors in the Intact Rat, 497
MCKUSICK, V. A. *See* Donahue, R. P., 949
MCMILLAN, J. E. Meromorphic Functions, Covering Properties, and Cluster Sets, 797
Macrolide antibiotics, and serum cholesterol levels (Schaffner and Gordon), 36
Macromolecules: immunogenicity of (Gill and Kunz), 490; and brain function (Adair *et al.*), 606, 917
MCSWAIN, B. D., and D. I. ARNON. Enhancement Effects and the Identity of the Two Photochemical Reactions of Photosynthesis, 989
Magnesium in cells, relation to adenylate kinase equilibrium (Rose), 1079
Maize: alcohol dehydrogenase control in (Efron and Schwartz), 586; control of rust in (Saxena and Hooker), 1300
MALLING, H. V. *See* Chu, E. H. Y., 1306
Mammalian cell genetics, effects of chemicals (Chu and Malling), 1306
Mammalian cell membranes, protein components of (Kiehn and Holland), 1370
Mammary gland of mouse, serial transplantation study (Daniel *et al.*), 53
Mapping of prophage λ and neighboring genes (Adhya *et al.*), 956
MARCAUD, L. *See* Kourilsky, P., 1013
MARCHALONIS, J. J., and G. J. V. NOSSAL. Electrophoretic Analysis of Antibody Produced by Single Cells, 860
MARCKER, K. A. *See* Monro, R. E., 1042
MARKLAND, F. S., E. SHAW, and E. L. SMITH. Identification of Histidine 64 in the Active Site of Subtilisin, 1440
MARSAGLIA, G. Random Numbers Fall Mainly in the Planes, 25
MARTIN, G. R. *See* Pinnell, S. R., 708
MARTIN, M. A. *See* Young, N. A., 548
MARVER, H. S. *See* Tenhunen, R., 748
MASAMUNE, Y., and C. C. RICHARDSON. Enzymatic Breakage and Joining of Deoxyribonucleic Acid, IV. DNA Synthesis in *E. coli* Infected with Ligase-Negative Mutants of Phage T4, 1328
MATHEMATICS. *See* Table of Contents, p. iii
MATHEWS, E. *See* Hosoda, J., 997
Mating: frequency in skippers and butterflies (Burns), 852; behavior in dogs, effect of hormones on (Beach and Merari), 442
MATTHIAS, B. T. *See* Arrhenius, G., 621
MATTIUZ, P. L. *See* Kahan, B. D., 897
MATTOCCIA, E. *See* Tocchini-Valentini, G. P., 146
MAXWELL, E. S. *See* Raeburn, S., 1428
MAZIA, D., and A. RUBY. Dissolution of Erythrocyte Membranes in Water and Comparison of the Membrane Protein with Other Structural Proteins, 1005
MEADOWS, D. H., and O. JARDETZKY. Nuclear Magnetic Resonance Studies of the Structure and Binding Sites of Enzymes, IV. Cytidine 3′-Monophosphate Binding to Ribonuclease, 406
MEDICAL SCIENCES. *See* Table of Contents, p. xi
Membrane(s): liposomal, immune response of (Haxby *et al.*), 300; effects of antibiotics on permeability of (Silman and Karlin), 674; spin-label studies in *N. crassa* (Keith *et al.*), 819; cellular, and tumor behavior (Wallach), 868; nerve, semiconduction in (Cope), 905; intestinal cell, metabolism of (Molenaar *et al.*), 982
Membranes, excitable: of nerve and muscle (Hubbell and McConnell), 12; ion movements across (Nachmansohn), 1034
Membrane-associated mitochondrial RNA in HeLa cells (Attardi and Attardi), 261
Membrane lipoprotein, with sphingomyelin (Widnell and Unkeless), 1050
Membrane protein: of beef erythrocytes (Mazia and Ruby), 1005; of mammalian cells (Kiehn and Holland), 1370
Memory, lengthening of, in mice (Barondes and Cohen), 923
MERARI, A. *See* Beach, F. A., 442
Meromorphic functions and cluster sets (McMillan), 797
Messenger RNA (*See* RNA, messenger)
Metabolic relationship between two LPS fractions in *E. coli* (Levy and Leive), 1435
Metals, liquid and gaseous, correspondence of (Ree and Chan), 367

Metaphase chromosomes, chromatin structure of (Mirsky *et al.*), 592
Metastable states in protein synthesis (Mitchell), 742
Metastasis, formation of, effect of platelet reduction on (Gasic *et al.*), 46
MEYER, B., L. F. PHILLIPS, and J. J. SMITH. Temperature Dependence of Intersystem Crossing: Lifetime and Intensity of SO_2 Phosphorescence in Low-Temperature Solids, 7
MEYER, R. R., and M. V. SIMPSON. DNA Biosynthesis in Mitochondria: Partial Purification of a Distinct DNA Polymerase from Isolated Rat Liver Mitochondria, 130
MICROBIOLOGY. *See* Table of Contents, p. vi
Microbiotas of the banded iron formations (Cloud and Licari), 779
Micrococcus radiodurans, transformation in (Moseley and Setlow), 176
Microsomal heme oxygenase and conversion of heme to bilirubin (Tenhunen *et al.*), 748
Migration, intramolecular, of acetyl group in adenosine derivatives (Neumann *et al.*), 1207
Minicells, *E. coli*, DNA from (Cohen *et al.*), 61
MINTON, A., and W. F. LIBBY. The Possibility of Direct Interaction between the Hemes in Hemoglobin, 1191
MIOVIC, M., and L. I. PIZER. Protein Initiation following Virulent Bacteriophage Infection, 192
MIRSKY, A. E., C. J. BURDICK, E. H. DAVIDSON, and V. C. LITTAU. The Role of Lysine-Rich Histone in the Maintenance of Chromatin Structure in Metaphase Chromosomes, 592
Miscoding in a cell-free system (Stavy), 347
Mispairing and intercalation in nucleic acid interactions (Pitha *et al.*), 332
MITCHELL, W. M. A Model for Protein Biosynthesis Predicated on the Concept of Metastable States: A Postulated Role for Genetic Code Degeneracy, 742
Mitochondria, isolated rat liver, ultrastructure of (Hackenbrock), 598
Mitochondrial DNA (*See* DNA, mitochondrial)
Mitochondrial leucyl-tRNA synthetase of *Neurospora* mutant (Gross *et al.*), 253
Mitochondrial lipids in *N. crassa*, spin-label studies (Keith *et al.*), 819
Model: of muscle contraction (Hill), 98; (Hill and White), 514, 889; of 50S ribosomal subunit (Lubin), 1454
MODOLELL, J., and B. D. DAVIS. Rapid Inhibition of Polypeptide Chain Extension by Streptomycin, 1279
Molecular arrangement in photosynthetic bacteria reaction centers (Sauer *et al.*), 17
Molecular structure of tRNA (Cramer *et al.*) 1384
Molecular-weight differences of urobilinogen components (Watson *et al.*), 223
MOLENAAR, I., F. A. HOMMES, W. G. BRAAMS, and H. A. POLMAN. Effect of Vitamin E on Membranes of the Intestinal Cell, 982
MOMANY, F. A., G. VANDERKOOI, and H. A. SCHERAGA. The Determination of Intermolecular Potentials from Crystal Data, I. General Theory and Application to Crystalline Benzene at Several Temperatures, 429
MONIER, R. *See* Aubert, M., 292
MONRO, R. E., J. ČERNÁ, and K. A. MARCKER. Ribosome-Catalyzed Peptidyl Transfer: Substrate Specificity at the P-Site, 1042
MORÁVEK, L. *See* Schechter, A. N., 1478
MORTENSON, L. E. *See* Bui, P. T., 1021
MOSCONA, A. A., M. H. MOSCONA, and N. SAENZ. Enzyme Induction in Embryonic Retina: The Role of Transcription and Translation, 160
MOSCONA, M. H. *See* Moscona, A. A., 160
MOSCOWITZ, A. *See* Watson, C. J., 223
MOSELEY, B. E. B., and J. K. SETLOW. Transformation in *Micrococcus radiodurans* and the Ultraviolet Sensitivity of Its Transforming DNA, 176
MOSIER, D. E., and L. W. COPPLESON. A Three-Cell Interaction Required for the Induction of the Primary Immune Response *in vitro*, 542
Mössbauer resonance studies: of ferric halides (Lewis and Drickamer), 414; of oxygen-bonded iron at high pressures (Fung *et al.*), 812
Mouse mammary gland, serial transplantation study of (Daniel *et al.*), 53
MOUZO, F. *See* Ewing, M., 787
mRNA (*See* RNA, messenger)
Muscle, excitable membranes of (Hubbell and McConnell), 12
Muscle contraction, sliding-filament model (Hill), 98; (Hill and White), 514, 889
Muscle response, catch property of (Wilson and Larimer), 909
Mutant(s): *E. coli*, with altered supernatant factor (Tocchini-Valentini and Mattoccia), 146; *Neurospora*, mitochondrial leucyl-tRNA synthetase of (Gross *et al.*), 253; human fibroblasts, thermolabile G6PD in (DeMars), 562; in yeast, mutagen-produced (Wills), 937; of phage T4, in DNA replication (Hosoda and Mathews), 997; RNA polymerase, of *E. coli* (Yura and Igarashi), 1313
Mutation frequency in chemically treated mammalian cells (Chu and Malling), 1306
Mycobacterium tuberculosis, ribosome from (Worcel *et al.*), 122
Myeloma γA immunoglobulin molecules in mouse (Seki *et al.*), 1071
Myoblasts, prolonged capacity to differentiate (Yaffe), 477
Myosin: cross-bridge and muscle contraction (Hill), 98; subfragment-I (Trotta *et al.*), selective cleavage from action of cyanogen bromide (Young *et al.*), 1087

NACHMANSOHN, D. Proteins in Bioelectricity: The Control of Ion Movements across Excitable Membranes, 1034
NAKAMOTO, T. *See* Klem, E. B., 1349
NANGERONI, L. L. *See* Blomquist, A. T., 688

NANNINGA, N. The Conformation of the 50S Ribosomal Subunit of *Bacillus subtilis*, 614
Nannofossils of the banded iron formations (Cloud and Licari), 779
NATIONAL ACADEMY OF SCIENCES. Lecture: Crises in Human Ecology (Harrar), 357
———. Autumn Meeting: Scientific Program and Abstracts of Contributed Papers, 1137
Nerve, excitable membranes of (Hubbell and McConnell), 12
Nerve growth factor, immunochemical properties (Zanini *et al.*), 835
Nerve membrane, semiconduction in (Cope), 905
Nerve tissue excitation, optical changes during (Tasaki *et al.*), 883
NEUMANN, H., V. E. SHASHOUA, J. C. SHEEHAN, and A. RICH. Intramolecular Acyl Migration in Adenosine Derivatives, 1207
Neuraminidase, effect on metastases, in mice (Gasic *et al.*), 46
Neurospora crassa, mitochondrial lipids in (Keith *et al.*), 819
Nicotinamide adenine dinucleotide (NAD), and diphtheria toxin, effect on GTPase activity (Raeburn *et al.*), 1428
Niobium alloy, superconductivity above 20.5°K (Arrhenius *et al.*), 621
NIRENBERG, M. *See* Wilcox, M., 229
———. *See* Scolnick, E., 768
Nitrogen-15 in mammalian cell DNA and RNA (Crane and Salzman), 1356
Nitrogen reduction, enzymatic (Bui and Mortenson), 1021
Nitrogenase enzyme complexes in bacteria (Detroy *et al.*), 537
Nonlinear operators in Banach spaces (Browder), 388
Nonparametric sequential tests (Darling and Robbins), 804
North Atlantic Ocean, ocean bottom photographs (Ewing and Mouzo), 787
NOSSAL, G. J. V. *See* Marchalonis, J. J., 860
Nuclear magnetic resonance (NMR) studies: of enzymes (Meadows and Jardetzky), 406; of gramicidin S-A (Stern *et al.*), 734; of cyanomethemoglobin (Wüthrich *et al.*), 1199
Nucleic acid interaction (Pitha *et al.*), 332

Ocean bottom, North Atlantic (Ewing and Mouzo), 787
ODELL, W. D., and R. S. SWERDLOFF. The Progestogen-Induced Luteinizing and Follicle-Stimulating Hormone Surge in Postmenopausal Women: A Simulated Ovulatory Peak, 529
OGAWA, S., H. M. MCCONNELL, and A. HORWITZ. Overlapping Conformation Changes in Spin-Labeled Hemoglobin, 401
OKAZAKI, R. *See* Sugimoto, K., 775
OKAZAKI, T. *See* Sugimoto, K., 775
Oligodeoxynucleotides, effect on DNA template activity (Goulian), 284
OLIVERA, B. M., Z. W. HALL, and I. R. LEHMAN. Enzymatic Joining of Polynucleotides, V. A DNA-Adenylate Intermediate in the Polynucleotide-Joining Reaction, 237
Optimality criteria in structural design (Prager), 794
Optimality of control systems (LaSalle and Wan), 375
OSNOS, M. *See* Hirschberg, E., 316
Ovulation in postmenopausal women (Odell and Swerdloff), 529
Oxidation state of iron, effect of pressure on (Fung *et al.*), 812
Oxidative phosphorylation, energy transfer reactions of (Sanadi *et al.*), 277
Oxygenation of human hemoglobin (Benesch *et al.*), 1102
Oxytocins, deuterated (Blomquist *et al.*), 688

Paramecium, development of basal bodies in (Dippell), 461
PAREJKO, R. A. *See* Detroy, R. W., 537
PARISH, C. R. *See* Ada, G. L., 556
PARK, C. R. *See* Friedmann, N., 504
PASTAN, I., and R. L. PERLMAN. The Role of the *Lac* Promotor Locus in the Regulation of β-Galactosidase Synthesis by Cyclic 3′,5′-Adenosine Monophosphate, 1336
———. *See* Roth, J., 138
PATHOLOGY. *See* Table of Contents, p. vi
PAULI, R. M. *See* Avers, C. J., 90
PELLEGRINO, M. A. *See* Kahan, B. D., 897
Pentose synthesis, and D-fructose, in *E. coli* (Caprioli and Rittenberg), 1422
Peptide binding, initiation factors and GTPase activity (Kolakofsky *et al.*), 1066
Peptide bond cleavage, from cyanogen bromide action upon myosin (Young *et al.*), 1087
Peptide linkage, lysine to allysine (Pinnell and Martin), 708
Peptidyl transfer reaction in protein synthesis (Monro *et al.*), 1042
Perfect groups (Conway), 398
PERLMAN, R. L. *See* Pastan, I., 1336
PESTKA, S. Studies on the Formation of Transfer Ribonucleic Acid-Ribosome Complexes, V. On the Function of a Soluble Transfer Factor in Protein Synthesis, 726
PETRYKA, Z. J. *See* Watson, C. J., 223
Phage infection and protein initiation (Miovic and Pizer), 192
Phage f2 RNA, effect of rifampicin, in *E. coli* (Fromageot and Zinder), 184
Phage λ DNA, transcription by b_2 region (Tonegawa and Hayashi), 1320
Phage λ mRNA, early synthesis of (Kourilsky *et al.*), 1013
Phage φX-174, transcription *in vivo* (Hayashi and Hayashi), 1107
Phage T4 DNA: replication *in vivo* (Hosoda and Mathews), 997; ligase-negative mutants (Masamune and Richardson), 1328
Phage T4-epecific S^{35}-tRNA (Weiss *et al.*), 114
Phage (*See also* Prophage)

Phaseolus vulgaris, mitochondrial DNA of (Wolstenholme and Gross), 245
Phenols, addition compounds of (D'Aprano and Fuoss), 1183
Phenylalanine polymer synthesis (Klem and Nakamoto), 1349
PHILLIPS, L. F. *See* Meyer, B., 7
Phosphoenolpyruvate-dependent phosphorylation of D-fructose (Hanson and Anderson), 269
Phosphorescence, SO_2, in low-temperature solids (Meyer *et al.*), 7
Photoconversion studies of phytochrome (Cross *et al.*), 1095
Photographs of ocean bottom, North Atlantic Ocean (Ewing and Mouzo), 787
Photosynthesis: in green plants, mechanism (Arnold and Azzi), 29; enhancement effects (McSwain and Arnon), 989; light-driven reactions, in *R. rubrum* (Sybesma and Fowler), 1343
Photosynthesis reaction centers (Sauer *et al.*), 17; (Zankel *et al.*), 1243
Photosynthetic bacterium *Rps. capsulata*, growth rate and cell composition of (Sojka and Gest), 1486
PHYSICS. *See* Table of Contents, p. iii
PHYSIOLOGY. *See* Table of Contents, p. v
Phytochrome, in plant nuclei (Galston), 454; low-temperature studies (Cross *et al.*), 1095
Phytohemagglutinin (PHA), effect on DNA polymerase in human lymphocytes (Loeb *et al.*), 827
PINNELL, S. R., and G. R. MARTIN. The Cross-Linking of Collagen and Elastin: Enzymatic Conversion of Lysine in Peptide Linkage to α-Aminoadipic-δ-Semialdehyde (Allysine) by an Extract from Bone, 708
PITHA, P. M., W. M. HUANG, and P. O. P. Ts'o. Physicochemical Basis of the Recognition Process in Nucleic Acid Interactions, IV. Costacking as the Cause of Mispairing and Intercalation in Nucleic Acid Interactions, 332
Pituitary, removal of, and secretion of epinephrine, in dogs (Wurtman *et al.*), 522
PIZER, L. I. *See* Miovic, M., 192
Plant nuclei, phytochrome in (Galston), 454
Plasma, immunoassay of "big insulin" in (Roth *et al.*), 138
Plasmalemma, locale of alkali cation absorption in plant cells (Welch and Epstein), 447
Platelet reduction, effect on metastases, in mice (Gasic *et al.*), 46
POHORECKY, L. A. *See* Wurtman, R. J., 522
POLMAN, H. A. *See* Molenaar, I., 982
Polymerase, DNA: from rat liver mitochondria (Meyer and Simpson), 130; induction by PHA in human lymphocytes (Loeb *et al.*), 827
Polymerase, RNA, interaction with rifamycin (Wehrli *et al.*), 667
Polymerase complex synthesizing active DNA (Ganesan), 1058
Polymorphisms in enzymes in *D. ananassae* (Gillespie and Kojima), 582
Polynucleotides: enzymatic repair of (Gupta and Khorana), 215; enzymatic joining of (Olivera *et al.*), 237; sequence homologies of (Young *et al.*), 548
Polynucleotide ligase: from rabbit bone marrow (Lindahl and Edelman), 680; in DNA replication (Hosoda and Mathews), 997
Polypeptide(s): conformation studies of (Craig), 152; hemoglobin, amino acid ambiguity in (Hilse and Popp), 930
Polypeptide chains (Gottlieb *et al.*), 168
Polypeptide cleavages in formation of poliovirus proteins (Jacobson and Baltimore), 77
Polypeptide structures in epimerase (Bertland and Kalckar), 629
Polyphenylalanine, synthesis of (Klem and Nakamoto), 1349
Polysome-ribosome cycle (Subramanian *et al.*), 761
Polysomes of mouse brain, uridine in (Adair *et al.*), 606, 917
POPP, R. A. *See* Hilse, K., 930
Potassium flux in rat liver, effect of 3′,5′-AMP (Friedmann and Park), 504
Potassium salt of 2,2,5,5-tetramethyl-3-carboxypyrroline-1-oxyl (Kruger and Boeyens), 422
PRAGER, W. Optimality Criteria in Structural Design, 794
Pressure effect on oxidation of iron (Fung *et al.*), 812; (Grenoble and Drickamer), 1177
Primary immune response *in vitro*, requirements for (Mosier and Coppleson), 542
Probabilities of large deviations (Feller), 1224
Probability study of specific gene locus assignment, in man (Donahue *et al.*), 949
Progesterone and estrogen dosage of bitches, effect on coital behavior (Beach and Merari), 442
Progestogen-induced hormone surge in women (Odell and Swerdloff), 529
Prophage λ, genetic mapping of (Adhya *et al.*), 956
Protein(s): poliovirus, from polypeptide cleavage (Jacobson and Baltimore), 77; nerve growth factor, immunochemical properties (Zanini *et al.*), 835; specificity of (Mazia and Ruby), 1005; in bioelectricity (Nachmansohn), 1034; conformation, and short-range interactions (Kotelchuck and Scheraga), 1163; viral structural (Velicer and Ginsberg), 1264; of mammalian cell membranes (Kiehn and Holland), 1370
Protein-enzyme interactions (Schechter *et al.*), 1478
Protein synthesis: and ribosomal subunit exchange (Kaempfer), 106; initiation following phage infection (Miovic and Pizer), 192; and nucleic acid synthesis, effect of inhibitors on (Hirschberg *et al.*), 316; miscoding in cell-free system (Stavy), 347; and ribosomal subunits in

mammalian cells (Colombo *et al.*), 651; soluble transfer factor in (Pestka), 726; metastable states in (Mitchell), 742
Protoheme synthesis, gene sequence in *S. aureus* (Tien and White) 1392
PSYCHOLOGY. *See* Table of Contents, p. vi
PUCK, T. T. *See* KAO, F. T., 775
Puffing in *S. coprophila* (Crouse), 971
Purification, selective, of enzymes (Cuatrecasas *et al.*), 636
Pyruvate, phosphate dikinase, reaction mechanism of (Evans and Wood), 1448

Quantum mechanics, delta functions in (Chan and Hirschfelder), 1
QUINT, J. *See* Hardy, M. A., 875

RAEBURN, S., R. S. GOOR, J. A. SCHNEIDER, and E. S. MAXWELL. Interaction of Aminoacyl Transferase II and Guanosine Triphosphate: Inhibition by Diphtheria Toxin and Nicotinamide Adenine Dinucleotide, 1428
RAFTERY, M. A. *See* Dahlquist, F. W., 1194
RAMANIS, Z. *See* Sager, R., 324
RAND-MEIER, T. *See* Dahlquist, F. W., 1194
Random numbers (Marsaglia), 25
Random variables: stopping time for sequences of (Starr and Woodroofe), 1215; asymptotic distribution of functions of (Robbins *et al.*), 1228
RAO, B. R. *See* Korenman, S. G., 1028
Rat liver mitochondrial DNA polymerase (Meyer and Simpson), 130
Rayleigh-Ritz approximation methods (Fix), 1219
Reactions, photochemical, of photosynthesis (McSwain and Arnon), 989
Reaction centers in photosynthetic bacteria (Zankel *et al.*), 1243
Reaction mechanism of pyruvate, phosphate dikinase (Evans and Wood), 1448
Recognition, enzymatic, of serine tRNA (Sundharadas *et al.*), 693
Recognition process in nucleic acid interactions (Pitha *et al.*), 332
Recursive partial functions and recursively enumerable sets (Eilenberg and Elgot), 378
REDHEFFER, R. An Inequality for the Hilbert Transform, 810
REE, F. H., and J. P. CHAN. Correspondence of Liquid and Gaseous Metals, 367
REED, D. W. *See* Zankel, K. L., 1243
REEL, J. R., and F. T. KENNEY. "Superinduction" of Tyrosine Transaminase in Hepatoma Cell Cultures: Differential Inhibition of Synthesis and Turnover by Actinomycin D, 200
Regulator gene in mouse (Shows and Ruddle), 574
REICH, E. *See* Ward, D. C., 1494
REISFELD, R. A. *See* Kahan, B. D., 897
Release factor for polypeptide chain termination (Scolnick *et al.*), 768
RENWICK, J. H. *See* Donahue, R. P., 949
Repair of short DNA duplexes (Gupta and Khorana), 215
Replication, discontinuous DNA synthesis during (Yudelevich *et al.*), 1129
Replication of DNA, *in vivo* (Hosoda and Mathews), 997
Replicative form DNA complex with mRNA (Hayashi and Hayashi), 1107
Reproductive rates of passerine birds (Ricklefs), 847
Resistance to rust, in maize (Saxena and Hooker), 1300
Retina, embryonic, transcription and translation in (Moscona *et al.*), 160
REYNIER, M. *See* Aubert, M., 292
Rhodopseudomonas capsulata, energy conversion and biosynthesis in (Sojka and Gest), 1486
Rhodospirillum rubrum, light-driven reactions in (Sybesma and Fowler), 1343
Ribonuclease (RNase), 3′-CMP binding to (Meadows and Jardetzky), 406
Ribosomal DNA (*See* DNA, ribosomal)
Ribosomal peptidyl transferase (Monro *et al.*), 1042
Ribosomal subunits: exchange during protein synthesis (Kaempfer), 106; 70*S*, from *M. tuberculosis* (Worcel *et al.*), 122; 50*S*, from *B. subtilis* (Nanninga), 614; and protein synthesis in mammalian cells (Colombo *et al.*), 651; 70*S*, deacylated tRNA from (Kuriki and Kaji), 1399; 50*S* model (Lubin), 1454
Ribosome: complexes with mRNA (Grollman and Stewart), 719; complexes with tRNA (Pestka), 726; dissociation factor from *E. coli* (Subramanian *et al.*), 761
RICH, A. *See* Neumann, H., 1207
RICH, D. H. *See* Blomquist, A. T., 688
RICHARDSON, C. C. *See* Masamune, Y., 1328
RICKLEFS, R. E. On the Limitation of Brood Size in Passerine Birds by the Ability of Adults to Nourish Their Young, 847
Rifampicin and RNA phage growth in *E. coli* (Fromageot and Zinder), 184
Rifamycin, interaction with bacterial RNA polymerase (Wehrli *et al.*), 667
RITTENBERG, D. *See* Caprioli, R., 1422
RNA: *in vitro* translation, in *Acetabularia* (Farber et al.), 843; density labeling with N^{15} (Crane and Salzman), 1356
RNA, messenger: attachment to ribosomes (Grollman and Stewart), 719; of phage λ (Kourilsky *et al.*), 1013; complex with replicative form DNA (Hayashi and Hayashi), 1107; SV40 genome, transcription of (Sauer and Kidwai), 1256; in germinating wheat embryo (Chen *et al.*), 1378
RNA, mitochondrial, in HeLa cells (Attardi and Attardi), 261
RNA, 5*S*, conformation change in (Aubert *et al.*), 292
RNA, transfer: coded by T4 genome (Weiss *et al.*), 114; coupling amino acid synthesis with protein synthesis (Wilcox and Nirenberg), 229; mitochondrial leucyl synthetase (Gross *et al.*), 253; inactivation by UV (Schulman and Cham-

bers), 308; specific enzymatic recognition of (Sundharadas *et al.*), 693; specific enzymatic hydrolysis of (Vogel *et al.*), 701; complexes with ribosomes (Pestka), 726; alanine, with acceptor activity (Loehr and Keller), 1115; N-acetylphenylalanyl- (Klem and Nakamoto), 1349; N-acetyltriphenylalanyl- (Haenni and Lucas-Lenard), 1363; conformation of (Cramer *et al.*), 1384; deacylated, release from ribosomes (Kuriki and Kaji), 1399

RNA polymerase: interaction with rifamycin (Wehrli *et al.*), 667; mutants resistant to streptovaricin (Yura and Igarashi), 1313; in purified reoviruses (Shatkin and Sipe), 1462

RNA synthesis: effect of rifampicin (Fromageot and Zinder), 184; b_2 region of λ DNA (Tonegawa and Hayashi), 1320; *See also* Control mechanisms

RNA's of certain polioviruses (Young *et al.*), 548

ROBBINS, H., D. SIEGMUND, and J. WENDEL. The Limiting Distribution of the Last Time $s_n \geq ns$, 1228

———. *See* Darling, D. A., 804

RON, E. Z. *See* Subramanian, A. R., 761

ROSE, I. A. The State of Magnesium in Cells as Estimated from the Adenylate Kinase Equilibrium, 1079

Rotatory components of a natural urobilinogen (Watson *et al.*), 223

Rotatory dispersion of polypeptides (Craig), 152

ROTH, J., P. GORDEN, and I. PASTAN. "Big Insulin": A New Component of Plasma Insulin Detected by Immunoassay, 138

rRNA (*See* RNA, ribosomal)

RUBY, A. *See* Mazia, D., 1005

RUDDLE, F. H. *See* Shows, T. B., 574

RUTISHAUSER, U., B. A. CUNNINGHAM, C. BENNETT, W. H. KONIGSBERG, and G. M. EDELMAN. Amino Acid Sequence of the Fc Region of a Human γG Immunoglobulin, 1414

SACHS, I. B. *See* Worcel, A., 122

SACHSON, R. A. *See* Kappas, A., 509

SAENZ, N. *See* Moscona, A. A., 160

SAGER, R., and Z. RAMANIS. The Pattern of Segregation of Cytoplasmic Genes in *Chlamydomonas*, 324

SALLY, P. J., JR., and J. A. SHALIKA. Characters of the Discrete Series of Representations of $SL(2)$ over a Local Field, 1231

SALZMAN, N. P. *See* Crane, N. A., 1356

SANADI, D. R., K. W. LAM, and C. K. R. KURUP. The Role of Factor B in the Energy Transfer Reactions of Oxidative Phosphorylation, 277

SANDLIN, R. *See* Tasaki, I., 883

SARID, S. *See* Chen, D., 1378

SAUER, G., and J. R. KIDWAI. The Transcription of the SV40 Genome in Productively Infected and Transformed Cells, 1256

SAUER, K., E. A. DRATZ, and L. COYNE. Circular Dichroism Spectra and the Molecular Arrangement of Bacteriochlorophylls in the Reaction Centers of Photosynthetic Bacteria, 17

SAXENA, K. M. S., and A. L. HOOKER. On the Structure of a Gene for Disease Resistance in Maize, 1300

SCHAFFNER, C. P., and H. W. GORDON. The Hypocholesterolemic Activity of Orally Administered Polyene Macrolides, 36

SCHECHTER, A. N., L. MORÁVEK, and C. B. ANFINSEN. Suppression of Hydrogen Exchange in Staphylococcal Nuclease by Ligands, 1478

SCHERAGA, H. A. *See* Momany, F. A., 429

———. *See* Kotelchuck, D., 1163

SCHERBERG, N. H. *See* Weiss, S. B., 114

SCHLIMME, E. *See* Cramer, F., 1384

SCHMID, K. *See* Wehrli, W., 667

SCHMID, R. *See* Tenhunen, R., 748

SCHNEIDER, J. A. *See* Raeburn, S., 1428

SCHULMAN, L. H., and R. W. CHAMBERS. Transfer RNA, II. A Structural Basis for Alanine Acceptor Activity, 308

SCHULTZ, J. S., D. C. SHREFFLER, and N. R. HARVIE. Genetic and Antigenic Studies and Partial Purification of a Human Serum Lipoprotein Carrying the Lp Antigenic Determinant, 963

SCHWARTZ, D. *See* Efron, Y., 586

Sciara coprophila, DNA synthesis and puff formation (Crouse), 971

SCOLNICK, E., R. TOMPKINS, T. CASKEY, and M. NIRENBERG. Release Factors Differing in Specificity for Terminator Codons, 768

SCOTT, J. F. *See* Aubert, M., 292

SEIDEL, H. *See* Cramer, F., 1384

SEKI, T., E. APPELLA, and H. A. ITANO. Chain Models of 6.6*S* and 3.9*S* Mouse Myeloma γA Immunoglobulin Molecules, 1071

Semiconduction in nerve membrane (Cope), 905

Sequence: of encephalitogenic peptides (Eylar and Hashim), 644; of genes for *S. aureus* protoheme synthesis (Tien and White), 1392; of amino acids in human γG immunoglobulin (Rutishauser *et al.*), 1414

Sequence homologies of polynucleotides (Young *et al.*), 548

Sequential tests, nonparametric (Darling and Robbins), 804

SETLOW, J. K. *See* Moseley, B. E. B., 176

SHALIKA, J. A. *See* Sally, P. J., Jr., 1231

SHASHOUA, V. E. *See* Neumann, H., 1207

SHATKIN, A. J., and J. D. SIPE. RNA Polymerase Activity in Purified Reoviruses, 1462

SHAW, E. *See* Markland, F. S., 1440

SHEEHAN, J. C. *See* Neumann, H., 1207

SHELDRICK, P. *See* Kourilsky, P., 1013

Shock compression of argon (Lin *et al.*), 1171

Short-range interactions within a single peptide unit (Kotelchuck and Scheraga), 1163

SHOWS, T. B., and F. H. RUDDLE. Function of the Lactate Dehydrogenase *B* Gene in Mouse Erythrocytes: Evidence for Control by a Regulatory Gene, 574
SHREFFLER, D. C. *See* Schultz, J. S., 963
SHULMAN, R. G. *See* Wüthrich, K., 1199
SIEGMUND, D. *See* Robbins, H., 1228
Significant structure theory of liquids (Lin *et al.*), 1171
SILMAN, H. I., and A. KARLIN. Action of Antibiotics Affecting Membrane Permeability of the Electroplax, 674, 1502 (erratum)
Simple flexible algebras (Block), 394
Simple groups (Conway), 398
Simplicial approximation of fixed points (Kuhn), 1238
SIMPSON, M. V. *See* Meyer, R. R., 130
SIPE, J. D. *See* Shatkin, A. J., 1462
Sliding-filament model of muscle contraction (Hill), 98; (Hill and White), 514, 889
SMITH, E. L. *See* Markland, F. S., 1440
SMITH, J. J. *See* Meyer, B., 7
SMITH, R. A. *See* Halpern, R. M., 207
SOJKA, G. A., and H. GEST. Integration of Energy Conversion and Biosynthesis in the Photosynthetic Bacterium *Rhodopseudomonas capsulata*, 1486
SÖLL, D. *See* Sundharadas, G., 693
SONG, C. S. *See* Kappas, A., 509
Sound-produced human transplantation antigen (Kahan *et al.*), 897
Specificity of enzyme hydrolyzing N-substituted aminoacyl-tRNA (Vogel *et al.*), 701
Spermatophore counts in insect populations (Burns), 852
Spin-label studies: of excitable membranes (Hubbell and McConnell), 12; of conformation changes in hemoglobin (Ogawa *et al.*), 401; of mitochondrial lipids in *N. crassa* (Keith *et al.*), 819
Spleen, miscoding in cell-free system from (Stavy), 347
Stability of control systems (LaSalle and Wan), 375
STAEHELIN, M. *See* Wehrli, W., 667
Staphylococcal nuclease, suppression of hydrogen exchange in (Schechter *et al.*), 1478
Staphylococcus aureus, gene sequence of protoheme of (Tien and White), 1392
STARR, N., and M. B. WOODROOFE. Remarks on a Stopping Time, 1215
STATE, D. *See* Hardy, M. A., 875
STAVY, L. Miscoding in a Cell-Free System from Spleen, 347
STEPLEWSKI, Z. *See* Knowles, B. B., 42
Stereograms for ambiguously perceivable surfaces (Julesz and Johnson), 437
STERN, A., W. A. GIBBONS, and L. C. CRAIG. A Conformational Analysis of Gramicidin S-A by Nuclear Magnetic Resonance, 734
STERNLICHT, E. *See* Kulka, R. G., 1123
Steroids enhancing ALA synthetase in chick embryo liver (Kappas *et al.*), 509
STEWART, C. C. *See* Gasic, T. B., 46
STEWART, M. L. *See* Grollman, A. P., 719
Stochastic model of kinetics of muscle contraction (Hill and White), 514
Stopping time for sequences of random variables (Starr and Woodroofe), 1215
STOUGHTON, R. W. *See* Lietzke, M. H., 775
STRACHER, A. *See* Trotta, P. P., 659
Streptomycin, effect on polypeptide synthesis (Modolell and Davis), 1279
Streptopelia, structure of G6PD in (Cooper and Irwin), 979
Streptovaricin and *E. coli* RNA polymerase mutants (Yura and Igarashi), 1313
Structural design, optimality criteria for (Prager), 794
Structural proteins (Mazia and Ruby), 1005
Structure: of 70*S* ribosome (Worcel *et al.*), 122; of alanine tRNA (Schulman and Chambers), 308; and binding sites of enzymes (Meadows and Jardetzky), 406; of potassium salt of 2,2,5,5-tetramethyl-3-carboxypyrroline-1-oxyl (Kruger and Boeyens), 422; of tubules in Gaucher's disease (Lee), 484; of polypeptides in epimerase (Bertland and Kalckar), 629; of encephalitogenic determinant (Eylar and Hashim), 644; of myosin molecule (Trotta *et al.*), 659; of G6PD in doves (Copper and Irwin), 979; of mouse myeloma γA immunoglobulins (Seki *et al.*), 1071; of gene for rust resistance, in maize (Saxena and Hooker), 1300; of blood group substances (Lloyd and Kabat), 1470. *See also* Conformation
Subfragment-I of myosin (Trotta *et al.*), 659
SUBRAMANIAN, A. R., E. Z. RON, and B. D. DAVIS. A Factor Required for Ribosome Dissociation in *Escherichia coli*, 761
Substrate specificity in peptidyl transfer reaction (Monro *et al.*), 1042
Subtilisin, histidine 64 in active site of (Markland *et al.*), 1440
Subunit exchange during protein synthesis (Kaempfer), 106
Sugar transport pathway (Hanson and Anderson), 269
SUGIMOTO, K., T. OKAZAKI, and R. OKAZAKI. Mechanism of DNA Chain Growth, II. Accumulation of Newly Synthesized Short Chains in *Escherichia coli* Infected with Ligase-Defective T4 Phages, 775 (erratum)
Sulfur dioxide, phosphorescence in low-temperature solids (Meyer *et al.*), 7
SUNDHARADAS, G., J. R. KATZE, D. SÖLL, W. KONIGSBERG, and P. LENGYEL. On the Recognition of Serine Transfer RNA's Specific for Unrelated Codons by the Same Seryl-Transfer RNA Synthetase, 693
Superconductivity of Nb-Al-Ge system (Arrhenius *et al.*), 621
Supernatant factor of a temperature-sensitive *E. coli* mutant (Tocchini-Valentini and Mattoccia), 146
SV40, rescue after fusion with other transformed cells (Knowles *et al.*), 42
SV40 mRNA genome, transcription of (Sauer and Kidwai), 1256
SWERDLOFF, R. S. *See* Odell, W. D., 529

SYBESMA, C., and C. F. FOWLER. Evidence for Two Light-Driven Reactions in the Purple Photosynthetic Bacterium, *Rhodospirillum rubrum*, 1343
Symmetrized algebras for the simple flexible algebras (Block), 394
Syn conformation of individual formycin residues (Ward and Reich), 1494
Synthesis: of DNA and protein, inhibition by trimethoprim (Miovic and Pizer), 192; of tyrosine transaminase, inhibited by actinomycin D (Reel and Kenney), 200; of protein and amino acid, role of tRNA (Wilcox and Nirenberg), 229; inhibitors in *D. discoideum* (Hirschberg *et al.*), 316; of crystalline deuterated deamino-oxytocins (Blomquist *et al.*), 688; of λ mRNA (Kourilsky *et al.*), 1013; of transforming DNA (Ganesan), 1058; of viral capsid proteins (Velicer and Ginsberg), 1264; of polypeptides inhibited by streptomycin (Modolell and Davis), 1279; of β-galactosidase, regulated by cyclic 3′,5′-AMP (Pastan and Perlman), 1336; of polyphenylalanine (Klem and Nakamoto), 1349; of N-acetyltriphenylalanyl-tRNA (Haenni and Lucas-Lenard), 1363; of protoheme in *S. aureus* (Tien and White), 1392; of pentose, role of D-fructose, in *E. coli* (Caprioli and Rittenberg), 1422; and energy conversion in *Rps. capsulata* (Sojka and Gest), 1486. *See also* DNA synthesis, Protein synthesis, RNA synthesis

TANAKA, Y. *See* Blunt, J. W., 1503
TASAKI, I., A. WATANABE, R. SANDLIN, and L. CARNAY. Changes in Fluorescence, Turbidity, and Birefringence Associated with Nerve Excitation, 883
Temperature, and intersystem crossing (Meyer *et al.*), 7
Temperature, > 20.5°K, superconductivity of Nb-Al-Ge system (Arrhenius *et al.*), 621
Temperature effect: on intermolecular potential of benzene crystals (Momany *et al.*), 429; on photoconversion of phytochrome (Cross *et al.*), 1095
Temperature-sensitive G6PD in mutant human fibroblasts (DeMars), 562
Temperature-sensitive mutant of *E. coli* (Tocchini-Valentini and Mattoccia), 146
TENENBAUM, J. *See* Cross, D. R., 1095
TENHUNEN, R., H. S. MARVER, and R. SCHMID. The Enzymatic Conversion of Heme to Bilirubin by Microsomal Heme Oxygenase, 748
Terminator-codon translation and release factors (Scolnick *et al.*), 768
Tests of hypotheses, nonparametric sequential (Darling and Robbins), 804
Tetrahydrofolate, requirement for protein and DNA synthesis (Miovic and Pizer), 192
2,2,5,5-Tetramethyl-3-carboxypyrroline-1-oxyl, structure of potassium salt of (Kruger and Boeyens), 422
THACH, R. E. *See* Kolakofsky, D., 1066
Thermodynamic correlations for liquid and gaseous metals (Ree and Chan), 367
Thin-film dialysis of polypeptides (Craig), 152
Thymosin, effect on allograft survival, in mice (Hardy *et al.*), 875
TIEN, W., and D. C. WHITE. Linear Sequential Arrangement of Genes for the Biosynthetic Pathway of Protoheme in *Staphylococcus aureus*, 1392
TOCCHINI-VALENTINI, G. P., and E. MATTOCCIA. A Mutant of *E. coli* with an Altered Supernatant Factor, 146
TODARO, G. J., and S. A. AARONSON. Human Cell Strains Susceptible to Focus Formation by Human Adenovirus Type 12, 1272
TOMPKINS, R. *See* Scolnick, E., 768
TONEGAWA, S., and M. HAYASHI. Genetic Transcription Directed by the b_2 Region of λ Bacteriophage, 1320
Topological spaces, cut points in (Whyburn), 380
Transcription: and enzyme induction in embryonic retina (Moscona *et al.*), 160; of SV40 genome (Sauer and Kidwai), 1256; by b_2 region of λ DNA (Tonegawa and Hayashi), 1320. *See also* Control mechanisms
Transfer of genetic material, in *E. coli* minicells (Cohen *et al.*), 61
Transfer RNA (*See* RNA, transfer)
Transferase II, interaction with GTP (Raeburn *et al.*), 1428
Transformation: in *M. radiodurans* (Moseley and Setlow), 176; human cell strains susceptible to (Todaro and Aaronson), 1272
Transformed cells, and fusion, in virus production (Knowles *et al.*), 42
Transition temperature of multiphase system (Arrhenius *et al.*), 621
Translation, and enzyme induction in embryonic retina (Moscona *et al.*), 160; of *Acetabularia* RNA *in vitro* (Farber *et al.*), 843
Transmission ratio distortion in mouse gametes (Dunn and Bennett), 570
Transplantation of mouse mammary tissue (Daniel *et al.*), 53
Transplantation antigen, human splenic (Kahan *et al.*), 897
Transition state in an enzyme-catalyzed reaction (Dahlquist *et al.*), 1194
Tripeptide, synthesis of (Haenni and Lucas-Lenard), 1363
tRNA (*See* RNA, transfer)
TROTTA, P. P., P. DREIZEN, and A. STRACHER. Studies on Subfragment-I, a Biologically Active Fragment of Myosin, 659
TS'O, P. O. P. *See* Pitha, P. M., 332
Tubule structure in Gaucher's disease (Lee), 484
Tumor behavior and cellular membranes (Wallach), 868
Tumor cell growth, inhibition by DNA (Halpern *et al.*), 207
Turbidity changes during nerve excitation (Tasaki *et al.*), 883
TWEED, D. *See* Lin, S. H., 1171
Two-factor inhibitor system of maize alcohol dehydrogenase (Efron and Schwartz), 586

Tyrosine transaminase: effect of actinomycin–D in hepatoma cells (Reel and Kenney), 200; activity, in rat (Black and Axelrod), 1287
TYTELL, A. A. *See* Field, A. K., 340

Ultraviolet (UV) sensitivity of transforming DNA in *M. radiodurans* (Moseley and Setlow), 176
UNKELESS, J. C. *See* Widnell, C. C., 1050
Uridine in mouse brain polysomes (Adair *et al.*), 606, 917
Urobilinogen, crystalline (Watson *et al.*), 223
Uterine cytosol, cytosol-estrogen binding protein of (Korenman and Rao), 1028

Valinomycin, effects on electroplax (Silman and Karlin), 674
VANDERKOOI, G. *See* Momany, F. A., 429
Variability, genetic, in yeast populations (Wills), 937
VELICER, L. F., and H. S. GINSBERG. Cytoplasmic Synthesis of Type 5 Adenovirus Capsid Proteins, 1264
VESCO C. *See* Colombo, B., 651
Vinyl polymers, immunogenicity of (Gill and Kunz), 490
Viral proteins: from polypeptide cleavages (Jacobson and Baltimore), 77; structural, synthesis of (Velicer and Ginsberg), 1264
Virus: SV40, effect of fusion with other transformed cells (Knowles *et al.*), 42; polio-, protein formation in (Jacobson and Baltimore), 77; polio-, polynucleotide sequence homologies among (Young *et al.*), 548. *See also* Adenovirus
Virus-specific RNA and reovirus RNA (Shatkin and Sipe), 1503
Vitamin D metabolite, 25-hydroxycholecalciferol (Blunt *et al.*), 1503
Vitamin E, effect on intestinal cell membranes (Molenaar *et al.*), 982
VOGEL, Z., A. ZAMIR, and D. ELSON. On the Specificity and Stability of an Enzyme that Hydrolyzes N-Substituted Aminoacyl-Transfer RNA's, 701

WAGGONER, A. S. *See* Keith, A. D., 819
WALLACH, D. F. H. Cellular Membranes and Tumor Behavior: A New Hypothesis, 868
WAN, S. *See* LaSalle, J. P., 375
WARD, D. C., and E. REICH. Conformational Properties of Polyformycin: A Polyribonucleotide with Individual Residues in the *Syn* Conformation, 1494
WATANABE, A. *See* Tasaki, I., 883
Water, addition compounds of (D'Aprano and Fuoss), 1183
Water-soluble human transplantation antigen (Kahan *et al.*), 897
Water stress and mRNA in germinating wheat embryo (Chen *et al.*), 1378
WATSON, C. J., D. A. LIGHTNER, A. MOSCOWITZ, E. DAVIS, Z. J. PETRYKA, and M. WEIMER. A Natural Crystalline Urobilinogen Composed of *d*- and *l*-Components of Differing Molecular Weight, 223
WAXDAL, M. J. *See* Gottlieb, P. D., 168
WEHRLI, W., F. KNÜSEL, K. SCHMID, and M. STAEHELIN. Interaction of Rifamycin with Bacterial RNA Polymerase, 667
WEIMER, M. *See* Watson, C. J., 223
Weinstein-Bazley approximation methods (Fix), 1219
WEISS, S. B., W. T. HSU, J. W. FOFT, and N. H. SCHERBERG. Transfer RNA Coded by the T4 Bacteriophage Genome, 114
WELCH, R. M., and E. EPSTEIN. The Dual Mechanisms of Alkali Cation Absorption by Plant Cells: Their Parallel Operation across the Plasmalemma, 447
WENDEL, J. *See* Robbins, H., 1228
WEVER, E. G. The Lacertid Ear: *Eremias argus*, 1292
Wheat embryo, mRNA in (Chen *et al.*), 1378
WHITE, A. *See* Hardy, M. A., 875
WHITE, D. C. *See* Tien, W., 1392
WHITE, G. M. *See* Hill, T. L., 514, 889
WHYBURN, G. T. Cut Points in General Topological Spaces, 380
WIDNELL, C. C., and J. C. UNKELESS. Partial Purification of a Lipoprotein with 5′-Nucleotidase Activity from Membranes of Rat Liver Cells, 1050
WILCHEK, M. *See* Cuatrecasas, P., 636
WILCOX, M., and M. NIRENBERG. Transfer RNA as a Cofactor Coupling Amino Acid Synthesis with That of Protein, 229
WILLS, C. Three Kinds of Genetic Variability in Yeast Populations, 937
WILSON, D. M., and J. L. LARIMER. The Catch Property of Ordinary Muscle, 909
WILSON, J. E. *See* Adair, L. B., 606, 917
WILSON, P. W. *See* Detroy, R. W., 537
WITZ, D. F. *See* Detroy, R. W., 537
WOLSTENHOLME, D. R., and N. J. GROSS. The Form and Size of Mitochondrial DNA of the Red Bean, *Phaseolus vulgaris*, 245
Women, progestogen-induced hormone surge in (Odell and Swerdloff), 529
WOOD, H. G. *See* Evans, H. J., 1448
WOODROOFE, M. B. *See* Starr, N., 1215
WOODSIDE, A. M. *See* Loeb, L. A., 827
WORCEL, A., D. S. GOLDMAN, and I. B. SACHS. Properties and Fine Structure of the Ribosomes from *Mycobacterium tuberculosis*, 122
WURTMAN, R. J., A. CASPER, L. A. POHORECKY, and F. C. BARTTER. Impaired Secretion of Epinephrine in Response to Insulin among Hypophysectomized Dogs, 522
WÜTHRICH, K., R. G. SHULMAN, and T. YAMANE. Proton Magnetic Resonance Studies of Human Cyanomethemoglobin, 1199

Xenopus laevis, DNA from yolk platelets of (Baltus *et al.*), 469

YAFFE, D. Retention of Differentiation Potentialities during Prolonged Cultivation of Myogenic Cells, 477

YAMANE, T. *See* Wüthrich, K., 1199
Yeast mitochondrial DNA (Avers *et al.*), 90
YOUNG, J. T. *See* Daniel, C. W., 53
YOUNG, M., M. H. BLANCHARD, and D. BROWN. Selective Nonenzymic Cleavage of the Myosin Rod: Isolation of the Coiled-Coil α-Rope Section from the C-Terminus of the Molecule, 1087
YOUNG, N. A., B. H. HOYER, and M. A. MARTIN. Polynucleotide Sequence Homologies among Polioviruses, 548
YUDELEVICH, A., B. GINSBERG, and J. HURWITZ. Discontinuous Synthesis of DNA during Replication, 1129
YURA, T., and K. IGARASHI. RNA Polymerase Mutants of *Escherichia coli*, I. Mutants Resistant to Streptovaricin, 1313

ZACHARIASEN, W. H. *See* Arrhenius, G., 621
ZAMIR, A. *See* Vogel, Z., 701
ZANINI, A., P. ANGELETTI, and R. LEVI-MONTALCINI. Immunochemical Properties of the Nerve Growth Factor, 835
ZANKEL, K. L., D. W. REED, and R. K. CLAYTON. Fluorescence and Photochemical Quenching in Photosynthetic Reaction Centers, 1243
ZEMP, J. W. *See* Adair, L. B., 606
ZINDER, N. D. *See* Fromageot, H. P. M., 184
ZOOLOGY. *See* Table of Contents, p. v

Proceedings of the

National Academy of Sciences

of the United States of America

VOLUME 61
SEPTEMBER–DECEMBER 1968

EDITORIAL BOARD OF THE PROCEEDINGS

JOHN T. EDSALL, *Chairman*

WALTER KAUZMANN, *Vice Chairman* JAMES V. NEEL, *Vice Chairman*

MERLE A. TUVE, *Home Secretary* HARRISON S. BROWN, *Foreign Secretary*

E. R. PIORE, *Treasurer*

H. W. BODE
CARL DJERASSI
KATHERINE ESAU
WILLIAM A. FOWLER
HERBERT FRIEDMAN
S. E. LURIA
GORDON J. F. MACDONALD
THEODORE T. PUCK
H. L. SHAPIRO
EMIL L. SMITH
JOSEPH L. WALSH

JOSEPHINE A. WILLIAMS, *Editorial Associate*

★

PUBLISHED MONTHLY BY
THE NATIONAL ACADEMY OF SCIENCES

CONTENTS

NATIONAL ACADEMY OF SCIENCES

LECTURE.—CRISES IN HUMAN ECOLOGY . . . . . *By J. G. Harrar* 357
AUTUMN MEETING.—SCIENTIFIC PROGRAM AND ABSTRACTS OF CONTRIBUTED PAPERS . 1137

PHYSICAL SCIENCES

MATHEMATICS

RANDOM NUMBERS FALL MAINLY IN THE PLANES . . . . . *By George Marsaglia* 25
ITERATION AND RECURSION . . . . . *By Samuel Eilenberg and Calvin G. Elgot* 378
CUT POINTS IN GENERAL TOPOLOGICAL SPACES . . . . . *By Gordon T. Whyburn* 380
NONLINEAR MONOTONE AND ACCRETIVE OPERATORS IN BANACH SPACES . . . . . *By Felix E. Browder* 388
DETERMINATION OF A^+ FOR THE SIMPLE FLEXIBLE ALGEBRAS . *By Richard E. Block* 394
A PERFECT GROUP OF ORDER 8,315,553,613,086,720,000 AND THE SPORADIC SIMPLE GROUPS . . . . . *By J. H. Conway* 398
MEROMORPHIC FUNCTIONS, COVERING PROPERTIES, AND CLUSTER SETS . . . . . *By J. C. McMillan* 797
SOME NONPARAMETRIC SEQUENTIAL TESTS WITH POWER ONE . . . . . *By D. A. Darling and Herbert Robbins* 804
AN INEQUALITY FOR THE HILBERT TRANSFORM . . . . . *By Ray Redheffer* 810
REMARKS ON A STOPPING TIME. . . *By Norman Starr and Michael B. Woodroofe* 1215
ORDERS OF CONVERGENCE OF THE RAYLEIGH-RITZ AND WEINSTEIN-BAZLEY METHODS . . . . . *By George Fix* 1219
ON PROBABILITIES OF LARGE DEVIATIONS . . . . . *By William Feller* 1224
THE LIMITING DISTRIBUTION OF THE LAST TIME $s_n \geq n\epsilon$ . . . . . *By H. Robbins, D. Siegmund, and J. Wendel* 1228
CHARACTERS OF THE DISCRETE SERIES OF REPRESENTATIONS OF $SL(2)$ OVER A LOCAL FIELD. . . . . *By P. J. Sally, Jr., and J. A. Shalika* 1231
SIMPLICIAL APPROXIMATION OF FIXED POINTS . . . . . *By Harold W. Kuhn* 1238

PHYSICS

EXPANDING THE DOMAIN OF THE LAPLACIAN OPERATOR WITH THE USE OF DELTA FUNCTIONS . . . . . *By Y. M. Chan and J. O. Hirschfelder* 1
A POSSIBLE RELATION BETWEEN COSMOLOGICAL QUANTITIES AND THE CHARACTERISTICS OF ELEMENTARY PARTICLES . . . . . *By Ralph A. Alpher and George Gamow* 363
CORRESPONDENCE OF LIQUID AND GASEOUS METALS . . . . . *By Francis H. Ree and John P. Chan* 367
SUPERCONDUCTIVITY OF Nb_3 (Al, Ge) ABOVE 20.5°K . *By G. Arrhenius, E. Corenzwit, R. Fitzgerald, G. W. Hull, Jr., H. L. Luo, B. T. Matthias, and W. H. Zachariasen* 621

CHEMISTRY

TEMPERATURE DEPENDENCE OF INTERSYSTEM CROSSING: LIFETIME AND INTENSITY OF SO_2 PHOSPHORESCENCE IN LOW-TEMPERATURE SOLIDS. . . . . *By B. Meyer, L. F. Phillips and J. J. Smith* 7
SPIN-LABEL STUDIES OF THE EXCITABLE MEMBRANES OF NERVE AND MUSCLE . . . . . *By Wayne L. Hubbell and Harden M. McConnell* 12
CIRCULAR DICHROISM SPECTRA AND THE MOLECULAR ARRANGEMENT OF BACTERIOCHLOROPHYLLS IN THE REACTION CENTERS OF PHOTOSYNTHETIC BACTERIA . . . . . *By Kenneth Sauer, Edward A. Dratz, and Lelia Coyne* 17
OVERLAPPING CONFORMATION CHANGES IN SPIN-LABELED HEMOGLOBIN . . . . . *By S. Ogawa, H. M. McConnell, and A. Horwitz* 401

NUCLEAR MAGNETIC RESONANCE STUDIES OF THE STRUCTURE AND BINDING SITES OF ENZYMES, IV. CYTIDINE 3′-MONOPHOSPHATE BINDING TO RIBONUCLEASE . . . . . *By Donella H. Meadows and Oleg Jardetzky* 406

HIGH-PRESSURE MÖSSBAUER RESONANCE STUDIES OF THE CONVERSION OF Fe(III) TO Fe(II) IN FERRIC HALIDES . . . *By G. K. Lewis, Jr., and H. G. Drickamer* 414

THE CRYSTAL AND MOLECULAR STRUCTURE OF THE POTASSIUM SALT OF 2,2,5,5-TETRAMETHYL-3-CARBOXYPYRROLINE-1-OXYL . *By Gert J. Kruger and Jan C. A. Boeyens* 422

THE DETERMINATION OF INTERMOLECULAR POTENTIALS FROM CRYSTAL DATA, I. GENERAL THEORY AND APPLICATION TO CRYSTALLINE BENZENE AT SEVERAL TEMPERATURES . . . *By F. A. Momany, G. Vanderkooi, and H. A. Scheraga* 429

THE EFFECT OF PRESSURE ON THE OXIDATION STATE OF IRON, II. OXYGEN LIGANDS . . . . . *By S. C. Fung, G. K. Lewis, Jr., and H. G. Drickamer* 812

SPIN-LABELED MITOCHONDRIAL LIPIDS IN *Neurospora crassa* . . . . . *By A. D. Keith, A. S. Waggoner, and O. H. Griffith* 819

THE INFLUENCE OF SHORT-RANGE INTERACTIONS ON PROTEIN CONFORMATION, I. SIDE CHAIN–BACKBONE INTERACTIONS WITHIN A SINGLE PEPTIDE UNIT . . . . . *By D. Kotelchuck and H. A. Scheraga* 1163

THE SIGNIFICANT STRUCTURE THEORY OF LIQUIDS APPLIED TO THE SHOCK COMPRESSION OF ARGON . . . . . *By S. H. Lin, D. Tweed, and H. Eyring* 1171

THE EFFECT OF PRESSURE ON THE OXIDATION STATE OF IRON, III. HEMIN AND HEMATIN . . . . . *By D. C. Grenoble and H. G. Drickamer* 1177

ADDITION COMPOUNDS OF WATER AND PHENOLS . . . . . *By Alessandro D'Aprano and Raymond M. Fuoss* 1183

THE POSSIBILITY OF DIRECT INTERACTION BETWEEN THE HEMES IN HEMOGLOBIN . . . . . *By Allen Minton and W. F. Libby* 1191

DEMONSTRATION OF CARBONIUM ION INTERMEDIATE DURING LYSOZYME CATALYSIS . . . . . *By F. W. Dahlquist, T. Rand-Meir, and M. A. Raftery* 1194

PROTON MAGNETIC RESONANCE STUDIES OF HUMAN CYANOMETHEMOGLOBIN . . . . . *By K. Wüthrich, R. G. Shulman, and T. Yamane* 1199

INTRAMOLECULAR ACYL MIGRATION IN ADENOSINE DERIVATIVES . . . . . *By Helmut Neumann, Victor E. Shashoua, John C. Sheehan, and Alexander Rich* 1207

GEOLOGY

MICROBIOTAS OF THE BANDED IRON FORMATIONS . . . . . *By Preston E. Cloud, Jr., and Gerald R. Licari* 779

GEOPHYSICS

OCEAN BOTTOM PHOTOGRAPHS IN THE AREA OF THE OLDEST KNOWN OUTCROPS, NORTH ATLANTIC OCEAN . . . . . *By Maurice Ewing and Felix Mouzo* 787

APPLIED PHYSICAL AND MATHEMATICAL SCIENCES

OPTIMALITY AND STRONG STABILITY OF CONTROL SYSTEMS . . . . . *By J. P. LaSalle and San Wan* 375

OPTIMALITY CRITERIA IN STRUCTURAL DESIGN . . . . . *By William Prager* 794

BIOLOGICAL SCIENCES

BOTANY

CHLOROPHYLL ENERGY LEVELS AND ELECTRON FLOW IN PHOTOSYNTHESIS . . . . . *By William Arnold and J. R. Azzi* 29

THE DUAL MECHANISMS OF ALKALI CATION ABSORPTION BY PLANT CELLS: THEIR PARALLEL OPERATION ACROSS THE PLASMALEMMA . . . . . *By R. M. Welch and Emanuel Epstein* 447

MICROSPECTROPHOTOMETRIC EVIDENCE FOR PHYTOCHROME IN PLANT NUCLEI . . . . . By Arthur W. Galston 454
FLUORESCENCE AND PHOTOCHEMICAL QUENCHING IN PHOTOSYNTHETIC REACTION CENTERS . . . By Kenneth L. Zankel, Dan W. Reed, and Roderick K. Clayton 1238

ZOOLOGY

THE DEVELOPMENT OF BASAL BODIES IN *Paramecium* . . . . By Ruth V. Dippell 461
ISOLATION OF DEOXYRIBONUCLEIC ACID FROM THE YOLK PLATELETS OF *Xenopus laevis* OÖCYTE . . . . . By E. Baltus, J. Hanocq-Quertier, and J. Brachet 469
RETENTION OF DIFFERENTIATION POTENTIALITIES DURING PROLONGED CULTIVATION OF MYOGENIC CELLS . . . . . By David Yaffe 477
IMMUNOCHEMICAL PROPERTIES OF THE NERVE GROWTH FACTOR . . . . . By Antonia Zonini, Pietro Angeletti, and Rita Levi-Montalcini 835
THE *in vitro* TRANSLATION OF *Acetabularia mediterranea* RNA. . . . . By F. E. Farber, M. Cape, M. Decroly, and J. Brachet 843
ON THE LIMITATION OF BROOD SIZE IN PASSERINE BIRDS BY THE ABILITY OF ADULTS TO NOURISH THEIR YOUNG . . . . . By Robert E. Ricklefs 847
MATING FREQUENCY IN NATURAL POPULATIONS OF SKIPPERS AND BUTTERFLIES AS DETERMINED BY SPERMATOPHORE COUNTS . . . . . By John M. Burns 852

PHYSIOLOGY

ON THE SLIDING-FILAMENT MODEL OF MUSCULAR CONTRACTION, II . . . . . By Terrell L. Hill 98
ESTROGEN RECEPTORS IN THE INTACT RAT . By John L. McGuire and Robert D. Lisk 497
EARLY EFFECTS OF 3′,5′-ADENOSINE MONOPHOSPHATE ON THE FLUXES OF CALCIUM AND POTASSIUM IN THE PERFUSED LIVER OF NORMAL AND ADRENALECTOMIZED RATS . . . . . By Naomi Friedmann and C. R. Park 504
THE INDUCTION OF δ-AMINOLEVULINIC ACID SYNTHETASE *in vivo* IN CHICK EMBRYO LIVER BY NATURAL STEROIDS . . . . . By Attallah Kappas, Chull S. Song, Richard D. Levere, Richard A. Sachson, and S. Granick 509
ON THE SLIDING-FILAMENT MODEL OF MUSCULAR CONTRACTION, III. KINETICS OF CROSS-BRIDGE FLUCTUATIONS IN CONFIGURATION . . . . . By Terrell L. Hill and George M. White 514
IMPAIRED SECRETION OF EPINEPHRINE IN RESPONSE TO INSULIN AMONG HYPOPHYSECTOMIZED DOGS . . . . . By Richard J. Wurtman, Alfred Casper, Larissa A. Pohorecky, and Frederick C. Bartter 522
PROGESTOGEN-INDUCED LUTEINIZING AND FOLLICLE-STIMULATING HORMONE SURGE IN POSTMENOPAUSAL WOMEN: A SIMULATED OVULATORY PEAK . . . . . By W. D. Odell and R. S. Swerdloff 529
CHANGES IN FLUORESCENCE, TURBIDITY, AND BIREFRINGENCE ASSOCIATED WITH NERVE EXCITATION . . . . . By I. Tasaki, A. Watanabe, R. Sandlin, and L. Carnay 883
ON THE SLIDING-FILAMENT MODEL OF MUSCULAR CONTRACTION, IV. CALCULATION OF FORCE-VELOCITY CURVES . . . . . By Terrell L. Hill and George M. White 889
WATER-SOLUBLE HUMAN TRANSPLANTATION ANTIGEN . . . . . By B. D. Kahan, R. A. Reisfeld, M. A. Pellegrino, E. S. Curtoni, P. L. Mattiuz, and R. Ceppellini 897
EVIDENCE FOR SEMICONDUCTION IN *Aplysia* NERVE MEMBRANE . . . . . By Freeman W. Cope 905
THE CATCH PROPERTY OF ORDINARY MUSCLE . . . . . By Donald M. Wilson and James L. Larimer 909
REGULATION OF THE DAILY RHYTHM IN TYROSINE TRANSAMINASE ACTIVITY BY ENVIRONMENTAL FACTORS . . . . . By I. B. Black and J. Axelrod 1287

PATHOLOGY

RESCUE OF INFECTIOUS SV40 AFTER FUSION BETWEEN DIFFERENT SV40-TRANSFORMED CELLS . . . . . *By Barbara B. Knowles, Fred C. Jenson, Zenon Steplewski, and Hilary Koprowsky* 42

ANTIMETASTATIC EFFECTS ASSOCIATED WITH PLATELET REDUCTION . . . . . *By Gabriel J. Gasic, Tatiana B. Gasic, and Carleton C. Stewart* 46

THE *in vivo* LIFE SPAN OF NORMAL AND PRENEOPLASTIC MOUSE MAMMARY GLANDS: A SERIAL TRANSPLANTATION STUDY . . . . . *By Charles W. Daniel, Kenneth B. DeOme, J. T. Young, Phyllis B. Blair, and Leslie J. Faulkin, Jr.* 53

THE FINE STRUCTURE OF THE CEREBROSIDE OCCURRING IN GAUCHER'S DISEASE . . . . . *By Robert E. Lee* 484

THE IMMUNOGENICITY OF VINYL POLYMERS . *By Thomas J. Gill III and Heinz W. Kunz* 490

MICROBIOLOGY

DNA ISOLATED FROM *Escherichia coli* MINICELLS MATED WITH F^+ CELLS . . . . . *By Amikam Cohen, W. D. Fisher, Roy Curtiss III, and H. I. Adler* 61

DEVELOPMENT OF THE SECONDARY HEMOLYSIN RESPONSE IN HIBERNATING GROUND SQUIRRELS (*Citellus tridecemlineatus*) . . . . . *By Bernard N. Jaroslow* 69

POLYPEPTIDE CLEAVAGES IN THE FORMATION OF POLIOVIRUS . . . . . *By Michael F. Jacobson and David Baltimore* 77

REDUCTION OF N_2 BY COMPLEMENTARY FUNCTIONING OF TWO COMPONENTS FROM NITROGEN-FIXING BACTERIA . . . . . *By R. W. Detroy, D. F. Wilz, R. A. Parejko, and P. W. Wilson* 537

A THREE-CELL INTERACTION REQUIRED FOR THE INDUCTION OF THE PRIMARY IMMUNE RESPONSE *in vitro* . . . . . *By D. E. Mosier and L. W. Coppleson* 542

POLYNUCLEOTIDE SEQUENCE HOMOLOGIES AMONG POLIOVIRUSES . . . . . *By N. A. Young, B. H. Hoyer, and M. A. Martin* 548

LOW ZONE TOLERANCE TO BACTERIAL FLAGELLIN IN ADULT RATS: A POSSIBLE ROLE FOR ANTIGEN LOCALIZED IN LYMPHOID FOLLICLES . *By G. L. Ada and C. R. Parish* 556

ELECTROPHORETIC ANALYSIS OF ANTIBODY PRODUCED BY SINGLE CELLS . . . . . *By J. J. Marchalonis and G. J. V. Nossal* 860

CELLULAR MEMBRANES AND TUMOR BEHAVIOR: A NEW HYPOTHESIS . . . . . *By Donald F. Hoelzl Wallach* 868

EFFECT OF THYMOSIN AND AN ANTITHYMOSIN SERUM ON ALLOGRAFT SURVIVAL IN MICE . . . . . *By M. A. Hardy, J. Quint, A. L. Goldstein, D. State, and A. White* 875

LYMPHOCYTE *in vitro* CYTOTOXICITY: CHARACTERIZATION OF HUMAN LYMPHOTOXIN . . . . . *By William P. Kolb and Gale A. Granger* 1250

THE TRANSCRIPTION OF THE SV40 GENOME IN PRODUCTIVELY INFECTED AND TRANSFORMED CELLS . . . . . *By G. Sauer and J. R. Kidwai* 1256

CYTOPLASMIC SYNTHESIS OF TYPE 5 ADENOVIRUS CAPSID PROTEINS . . . . . *By Leland F. Velicer and Harold S. Ginsberg* 1264

HUMAN CELL STRAINS SUSCEPTIBLE TO FOCUS FORMATION BY HUMAN ADENOVIRUS TYPE 12 . . . . . *By George J. Todaro and Stuart A. Aaronson* 1272

RAPID INHIBITION OF POLYPEPTIDE CHAIN EXTENSION BY STREPTOMYCIN . . . . . *By Juan Modolell and Bernard D. Davis* 1279

PSYCHOLOGY

STEREOGRAMS PORTRAYING AMBIGUOUSLY PERCEIVABLE SURFACES . . . . . *By B. Julesz and S. C. Johnson* 437

COITAL BEHAVIOR IN DOGS, IV. EFFECTS OF PROGESTERONE IN THE BITCH . . . . . *By Frank A. Beach and Ariel Merari* 442

BRAIN FUNCTION AND MACROMOLECULES, IV. URIDINE INCORPORATION INTO POLYSOMES OF MOUSE BRAIN DURING DIFFERENT BEHAVIORAL EXPERIENCES . . . . . *By Linda B. Adair, John Eric Wilson, and Edward Glassman* 917

AROUSAL AND THE CONVERSION OF "SHORT-TERM" TO "LONG-TERM" MEMORY . . . . . *By Samuel H. Barondes and Harry D. Cohen* 923

THE LACERTID EAR: *Eremias argus* . . . . . *By Ernest Glen Wever* 1292

BIOCHEMISTRY

RIBOSOMAL SUBUNIT EXCHANGE DURING PROTEIN SYNTHESIS . *By Ramond Kaempfer* 106

TRANSFER RNA CODED BY THE T4 BACTERIOPHAGE GENOME . . . . . *By Samuel B. Weiss, Wen-Tah Hsu, John W. Foft, and Neal H. Scherberg* 114

PROPERTIES AND FINE STRUCTURE OF THE RIBOSOMES FROM *Mycobacterium tuberculosis* . . . . . *By A. Worcel, Dexter S. Goldman, and Irving B. Sachs* 122

DNA BIOSYNTHESIS IN MITOCHONDRIA: PARTIAL PURIFICATION OF A DISTINCT DNA POLYMERASE FROM ISOLATED RAT LIVER MITOCHONDRIA . . . . . *By Ralph R. Meyer and Melvin V. Simpson* 130

"BIG INSULIN": A NEW COMPONENT OF PLASMA INSULIN DETECTED BY IMMUNOASSAY . . . . . *By Jesse Roth, Phillip Gorden, and Ira Pastan* 138

A MUTANT OF *E. coli* WITH AN ALTERED SUPERNATANT FACTOR . . . . . *By G. P. Tocchini-Valentini and E. Mattoccia* 146

CONFORMATION STUDIES WITH POLYPEPTIDES BY ROTATORY DISPERSION AND THIN-FILM DIALYSIS . . . . . *By Lyman C. Craig* 152

ENZYME INDUCTION IN EMBRYONIC RETINA: THE ROLE OF TRANSCRIPTION AND TRANSLATION . . . . . *By A. A. Moscona, M. H. Moscona, and N. Saenz* 160

VARIABLE REGIONS OF HEAVY AND LIGHT POLYPEPTIDE CHAINS OF THE SAME γG-IMMUNOGLOBULIN MOLECULE . . . . . *By Paul D. Gottlieb, Bruce A. Cunningham, Myron J. Waxdal, William H. Konigsberg, and Gerald M. Edelman* 168

TRANSFORMATION IN *Micrococcus radiodurans* AND THE ULTRAVIOLET SENSITIVITY OF ITS TRANSFORMING DNA . . . . . *By B. E. B. Moseley and Jane K. Setlow* 176

GROWTH OF BACTERIOPHAGE f2 IN *E. coli* TREATED WITH RIFAMPICIN . . . . . *By Henri P. M. Fromageot and Norton D. Zinder* 184

PROTEIN INITIATION FOLLOWING VIRULENT BACTERIOPHAGE INFECTION . . . . . *By Margaret Miovic and Lewis I. Pizer* 192

"SUPERINDUCTION" OF TYROSINE TRANSAMINASE IN HEPATOMA CELL CULTURES: DIFFERENTIAL INHIBITION OF SYNTHESIS AND TURNOVER BY ACTINOMYCIN D . . . . . *By Jerry R. Reel and Francis T. Kenney* 200

INHIBITION OF NEOPLASTIC CELL GROWTH BY AUTOGENOUS DNA . . . . . *By Richard M. Halpern, Barbara C. Halpern, K. A. Conklin, and Roberts A. Smith* 207

STUDIES ON POLYNUCLEOTIDES, XC. DNA POLYMERASE-CATALYZED REPAIR OF SHORT DNA DUPLEXES WITH SINGLE-STRANDED ENDS . . . . . *By N. K. Gupta and H. G. Khorana* 215

A NATURAL CRYSTALLINE UROBILINOGEN COMPOSED OF *d*- AND *l*-COMPONENTS OF DIFFERING MOLECULAR WEIGHT . . . . . *By C. J. Watson, D. A. Lightner, A. Moscowitz, E. Davis, Z. J. Petryka, and M. Weimer* 223

TRANSFER RNA AS A COFACTOR COUPLING AMINO ACID SYNTHESIS WITH THAT OF PROTEIN . . . . . *By Michael Wilcox and Marshall Nirenberg* 229

ENZYMATIC JOINING OF POLYNUCLEOTIDES, V. A DNA-ADENYLATE INTERMEDIATE IN THE POLYNUCLEOTIDE-JOINING REACTION . . . . . *By Baldomero M. Olivera, Zach W. Hall, and I. R. Lehman* 237

THE FORM AND SIZE OF MITOCHONDRIAL DNA OF THE RED BEAN, *Phaseolus vulgaris* . . . . . *By David R. Wolstenholme and Nicholas J. Gross* 245

EVIDENCE FOR THE INVOLVEMENT OF A NUCLEAR GENE IN THE PRODUCTION OF THE MITOCHONDRIAL LEUCYL-tRNA SYNTHETASE OF *Neurospora* . . . . . *By S. R. Gross, Martha T. McCoy, and Evelyn B. Gilmore* 253

Mitochondrial Origin of Membrane-Associated Heterogeneous RNA in HeLa Cells . . . . . *By Giuseppe Attardi and Barbara Attardi* 261

Phosphoenolpyruvate-Dependent Formation of D-Fructose 1-Phosphate by a Four-Component Phosphotransferase System . . . . . *By T. E. Hanson and R. L. Anderson* 269

The Role of Factor B in the Energy Transfer Reactions of Oxidative Phosphorylation . . *By D. R. Sanadi, K. W. Lam, and C. K. Ramakrishna Kurup* 277

Incorporation of Oligodeoxynucleotides into DNA . . . *By Mehran Goulian* 284

Rearrangement of the Conformation of *Escherichia coli* 5*S* RNA . . . . . *By M. Aubert, J. F. Scott, M. Reynier, and R. Monier* 292

Immune Response of a Liposomal Model Membrane . . . . . *By James A. Haxby, Constance B. Kinsky, and Stephen C. Kinsky* 300

Transfer RNA, II. A Structural Basis for Alanine Acceptor Activity . . . . . *By LaDonne H. Schulman and Robert Warner Chambers* 308

Effects of Inhibitors of Nucleic Acid and Protein Synthesis on Growth and Aggregation of the Cellular Slime Mold *Dictyostelium discoideum* . . . . *By Erich Hirschberg, Constante Ceccarini, Martha Osnos, and Richard Carchman* 316

The Pattern of Segregation of Cytoplasmic Genes in *Chlamydomonas* . . . . . *By Ruth Sager and Zenta Ramanis* 324

Physicochemical Basis of the Recognition Process in Nucleic Acid Interactions, IV. Costacking as the Cause of Mispairing and Intercalation in Nucleic Acid Interactions. . . . *By P. M. Pilha, W. M. Huang, and P. O. P. Ts'o* 332

Inducers of Interferon and Host Resistance, V. *In vitro* Studies . . . . . *By A. K. Field, A. A. Tytell, G. P. Lampson, and M. R. Hilleman* 340

Miscoding in a Cell-Free System from Spleen . . . . . *By Lary Stavy* 347

The Role of Lysine-Rich Histone in the Maintenance of Chromatin Structure in Metaphase Chromosomes . . . . . *By A. E. Mirsky, C. J. Burdick, E. H. Davidson, and V. C. Littau* 592

Chemical and Physical Fixation of Isolated Mitochondria in Low-Energy and High-Energy States . . . . . *By Charles R. Hackenbrock* 598

Brain Function and Macromolecules, III. Uridine Incorporation into Polysomes of Mouse Brain during Short-Term Avoidance Conditioning . . . *By Linda B. Adair, John Eric Wilson, John W. Zemp, and Edward Glassman* 606

The Conformation of the 50*S* Ribosomal Subunit of *Bacillus subtilis* . . . . . *By N. Nanninga* 614

Reversible Changes of Ordered Polypeptide Structures in Oxidized and Reduced Epimerase . . . . . *By A. U. Bertland II and H. M. Kalckar* 629

Selective Enzyme Purification by Affinity Chromatography . . . . . *By Pedro Cuatrecasas, Meir Wilchek, and Christian B. Anfinsen* 636

Allergic Encephalomyelitis: The Structure of the Encephalitogenic Determinant . . . . . *By E. H. Eylar and George A. Hashim* 644

Role of Ribosomal Subunits in Protein Synthesis in Mammalian Cells . . . . . *By B. Colombo, C. Vesco, and C. Baglioni* 651

Studies on Subfragment-I, A Biologically Active Fragment of Myosin . . . . . *By P. P. Trotta, P. Dreizen, and A. Stracher* 659

Interaction of Rifamycin with Bacterial RNA Polymerase . . . . . *By Walter Wehrli, Fritz Knüsel, Karl Schmid, and Matthys Staehelin* 667

Action of Antibiotics Affecting Membrane Permeability on the Electroplax . . . . . *By H. I. Silman and Arthur Karlin* 674

Polynucleotide Ligase from Myeloid and Lymphoid Tissue . . . . . *By Tomas Lindahl and Gerald M. Edelman* 680

Deuterated Oxytocins: The Synthesis and Biological Properties of Three Crystalline Analogs of Deamino-Oxytocin Deuterated in the 1-β-Mercaptopropionic Acid Position . . . . . *By Alfred T. Blomquist, Daniel H. Rich, Victor J. Hruby, Louis L. Nangeroni, Paula Glose, and Vincent du Vigneaud* 688

ON THE RECOGNITION OF SERINE TRANSFER RNA'S SPECIFIC FOR UNRELATED CODONS BY THE SAME SERYL-TRANSFER RNA SYNTHETASE . . . . . *By G. Sundharadas, Jon R. Katze, Dieter Söll, William Konigsberg, and Peter Lengyel* 693

ON THE SPECIFICITY AND STABILITY OF AN ENZYME THAT HYDROLYZES N-SUBSTITUTED AMINOACYL-TRANSFER RNA'S . . *By Zvi Vogel, Ada Zamir, and David Elson* 701

THE CROSS-LINKING OF COLLAGEN AND ELASTIN: ENZYMATIC CONVERSION OF LYSINE IN PEPTIDE LINKAGE TO α-AMINOADIPIC-δ-SEMIALDEHYDE (ALLYSINE) BY AN EXTRACT FROM BONE . . . . . *By Sheldon R. Pinnell and George R. Martin* 708

INHIBITION OF THE ATTACHMENT OF MESSENGER RIBONUCLEIC ACID TO RIBOSOMES . . . . . *By Arthur P. Grollman and Margaret L. Stewart* 719

STUDIES ON THE FORMATION OF TRANSFER RIBONUCLEIC ACID-RIBOSOME COMPLEXES, V. ON THE FUNCTION OF A SOLUBLE TRANSFER FACTOR IN PROTEIN SYNTHESIS . . . . . *By Sidney Pestka* 726

A CONFORMATIONAL ANALYSIS OF GRAMICIDIN S-A BY NUCLEAR MAGNETIC RESONANCE . . . . . *By Arnold Stern, William A. Gibbons, and Lyman C. Craig* 734

A MODEL FOR PROTEIN BIOSYNTHESIS PREDICATED ON THE CONCEPT OF METASTABLE STATES: A POSTULATED ROLE FOR GENETIC CODE DEGENERACY . . . . . *By William M. Mitchell* 742

THE ENZYMATIC CONVERSION OF HEME TO BILIRUBIN BY MICROSOMAL HEME OXYGENASE . . . . . *By Raimo Tenhunen, Harvey S. Marver, and Rudi Schmid* 748

THE RELATIONSHIP BETWEEN RED CELL 2,3-DIPHOSPHOGLYCERATE AND LEVELS OF HEMOGLOBIN IN THE HUMAN . . . *By John W. Eaton and George J. Brewer* 756

A FACTOR REQUIRED FOR RIBOSOME DISSOCIATION IN *Escherichia coli* . . . . . *By A. R. Subramanian, Eliora Z. Ron, and Bernard D. Davis* 761

RELEASE FACTORS DIFFERING IN SPECIFICITY FOR TERMINATOR CODONS . . . . . *By E. Scolnick, R. Tompkins, T. Caskey, and M. Nirenberg* 768

EFFECT OF VITAMIN E ON MEMBRANES OF THE INTESTINAL CELL . . . . . *By I. Molenaar, F. A. Hommes, W. G. Braams, and H. A. Polman* 982

ENHANCEMENT EFFECTS AND THE IDENTITY OF THE TWO PHOTOCHEMICAL REACTIONS OF PHOTOSYNTHESIS . . . . . *By Berah D. McSwain and Daniel I. Arnon* 989

DNA REPLICATION *in vivo* BY A TEMPERATURE-SENSITIVE POLYNUCLEOTIDE LIGASE MUTANT OF T4 . . . . . *By Junko Hosoda and Elaine Mathews* 997

DISSOLUTION OF ERYTHROCYTE MEMBRANES IN WATER AND COMPARISON OF THE MEMBRANE PROTEIN WITH OTHER STRUCTURAL PROTEINS . . . . . *By Daniel Mazia and Albert Ruby* 1005

STUDIES ON THE MESSENGER RNA OF BACTERIOPHAGE λ, I. VARIOUS SPECIES SYNTHESIZED EARLY AFTER INDUCTION OF THE PROPHAGE . . . . . *By Philippe Kourilsky, Lise Marcaud, Peter Sheldrick, Denise Luzzati, and François Gros* 1013

MECHANISM OF THE ENZYMATIC REDUCTION OF N_2: THE BINDING OF ADENOSINE 5′-TRIPHOSPHATE AND CYANIDE TO THE N_2-REDUCING SYSTEM . . . . . *By P. T. Bui and L. E. Mortenson* 1021

REVERSIBLE DISAGGREGATION OF THE CYTOSOL-ESTROGEN BINDING PROTEIN OF UTERINE CYTOSOL . . . . . *By Stanley G. Korenman and B. Ramanath Rao* 1028

PROTEINS IN BIOELECTRICITY: THE CONTROL OF ION MOVEMENTS ACROSS EXCITABLE MEMBRANES. . . . . *By David Nachmansohn* 1034

RIBOSOME-CATALYZED PEPTIDYL TRANSFER: SUBSTRATE SPECIFICITY AT THE P-SITE . . . . . *By Robin E. Monro, Jiriná Černá, and Kjeld A. Marcker* 1042

PARTIAL PURIFICATION OF A LIPOPROTEIN WITH 5′-NUCLEOTIDASE ACTIVITY FROM MEMBRANES OF RAT LIVER CELLS . . . . . *By Christopher C. Widnell and Jay C. Unkeless* 1050

STUDIES ON THE *in vitro* SYNTHESIS OF TRANSFORMING DNA . . *By A. T. Ganesan* 1058

GUANOSINE 5′-TRIPHOSPHATASE ACTIVITY OF INITIATION FACTOR F_2 . . . . . *By Daniel Kolakofsky, Kathryn F. Dewey, John W. B. Hershey, and Robert E. Thach* 1066

CHAIN MODELS OF 6.6*S* AND 3.9*S* MOUSE MYELOMA γA IMMUNOGLOBULIN MOLECULES . . . . . *By T. Seki, E. Appella, and H. A. Itano* 1071

The State of Magnesium in Cells as Estimated from the Adenylate Kinase Equilibrium . . . . . *By Irwin A. Rose* 1079

Selective Nonenzymatic Cleavage of the Myosin Rod: Isolation of the Coiled-Coil α-Rope Section from the C-Terminus of the Molecule . . . . . *By Michael Young, Muriel H. Blanchard, and Deloss Brown* 1087

Low-Temperature Studies on Phytochrome: Light and Dark Reactions in the Red to Far-Red Transformation and New Intermediate Forms of Phytochrome . . . . . *By David R. Cross, Henry Linschitz, Volker Kasche, and Joseph Tenenbaum* 1095

The Interaction of Hemoglobin and Its Subunits with 2,3-Diphosphoglycerate . . . . . *By Reinhold Benesch, Ruth E. Benesch, and Yasunori Enoki* 1102

The Stability of Native DNA-RNA Complexes during *in vivo* ΦX-174 Transcription . . . . . *By Marie N. Hayashi and Masaki Hayashi* 1107

Dimers of Alanine Transfer RNA with Acceptor Activity . . . . . *By Joann S. Loehr and Elizabeth B. Keller* 1115

Enzyme Secretion in Mouse Pancreas Mediated by Adenosine-3′,5′-Cyclic Phosphate and Inhibited by Adenosine-3′-Phosphate. . . . . *By R. G. Kulka and E. Sternlicht* 1123

Discontinuous Synthesis of DNA during Replication. . . . . *By Arturo Yudelevich, Barry Ginsberg, and Jerard Hurwitz* 1129

Enzymatic Breakage and Joining of Deoxyribonucleic Acid, IV. DNA Synthesis in *E. coli* Infected with Ligase-Negative Mutants of Phage T4 . . . . . *By Yukito Masamune and Charles C. Richardson* 1328

The Role of the *Lac* Promotor Locus in the Regulation of β-Galactosidase Synthesis by Cyclic 3′,5′-Adenosine Monophosphate . . . . . *By Ira Pastan and Robert L. Perlman* 1336

Evidence for Two Light-Driven Reactions in the Purple Photosynthetic Bacterium, *Rhodospirillum rubrum* . *By Christiaan Sybesma and Charles F. Fowler* 1343

The Initiation of Polyphenylalanine Synthesis with N-Acetylphenylalanyl-tRNA . . . . . *By Edward B. Klem and Tokumasa Nakamoto* 1349

Density Labeling of Mammalian Cell DNA and RNA with Nitrogen-15 . . . . . *By N. A. Crane and N. P. Salzman* 1356

Stepwise Synthesis of a Tripeptide . *By Anne-Lise Haenni and Jean Lucas-Lenard* 1363

Multiple Protein Components of Mammalian Cell Membranes . . . . . *By E. Donald Kiehn and John J. Holland* 1370

The Role of Water Stress in the Inactivation of Messenger RNA of Germinating Wheat Embryos . . . *By David Chen, Sara Sarid, and Ephraim Katchalski* 1378

On the Conformation of Transfer RNA. . . . . *By F. Cramer, H. Doepner, F. v.d. Haar, E. Schlimme, and H. Seidel* 1384

Linear Sequential Arrangement of Genes for the Biosynthetic Pathway of Protoheme in *Staphylococcus aureus* . . *By Weichen Tien and David C. White* 1392

Factor- and Guanosine 5′-Triphosphate-Dependent Release of Deacylated Transfer RNA from 70*S* Ribosomes . . *By Yoshitaka Kuriki and Akira Kaji* 1399

Generation of Higher Multiple Circular DNA Forms in Bacteria . . . . . *By Werner Goebel and Donald R. Helinski* 1406

Amino Acid Sequence of the Fc Region of a Human γG Immunoglobulin . . . . . *By Urs Rutishauser, Bruce A. Cunningham, Carl Bennett, William H. Konigsberg, and Gerald M. Edelman* 1414

On the Utilization of D-Fructose for Pentose Synthesis in *Escherichia coli* . . . . . *By Richard Caprioli and David Rittenberg* 1422

Interaction of Aminoacyl Transferase II and Guanosine Triphosphate: Inhibition by Diphtheria Toxin and Nicotinamide Adenine Dinucleotide . *By Samuel Raeburn, Ronald S. Goor, Jerry A. Schneider, and Elizabeth S. Maxwell* 1428

An Equilibrium between Two Fractions of Lipopolysaccharide in *Escherichia coli* . . . . . *By Stuart B. Levy and Loretta Leive* 1435

IDENTIFICATION OF HISTIDINE 64 IN THE ACTIVE SITE OF SUBTILISIN . . . . . *By Francis S. Markland, Elliott Shaw, and Emil L. Smith* 1440

THE MECHANISM OF THE PYRUVATE, PHOSPHATE DIKINASE REACTION . . . . . *By Herbert J. Evans and Harland G. Wood* 1448

OBSERVATIONS ON THE SHAPE OF THE 50S RIBOSOMAL SUBUNIT . . *By Martin Lubin* 1454

RNA POLYMERASE ACTIVITY IN PURIFIED REOVIRUSES. . . . . *By A. J. Shatkin and J. D. Sipe* 1462

IMMUNOCHEMICAL STUDIES ON BLOOD GROUPS, XLI. PROPOSED STRUCTURE FOR THE CARBOHYDRATE PORTIONS OF BLOOD GROUP A, B, H, LEWIS[a], AND LEWIS[b] SUBSTANCES . . . . . *By Kenneth O. Lloyd and Elvin A. Kabat* 1470

SUPPRESSION OF HYDROGEN EXCHANGE IN STAPHYLOCOCCAL NUCLEASE BY LIGANDS . . . . . *By Alan N. Schechter, Ladislav Morávek, and Christian B. Anfinsen* 1478

INTEGRATION OF ENERGY CONVERSION AND BIOSYNTHESIS IN THE PHOTOSYNTHETIC BACTERIUM *Rhodopseudomonas capsulata*. . *By Gary A. Sojka and Howard Gest* 1486

CONFORMATIONAL PROPERTIES OF POLYFORMYCIN: A POLYRIBONUCLEOTIDE WITH INDIVIDUAL RESIDUES IN THE *Syn* CONFORMATION . *By D. C. Ward and E. Reich* 1494

THE BIOLOGICAL ACTIVITY OF 25-HYDROXYCHOLECALCIFEROL, A METABOLITE OF VITAMIN D_3 . . . . . *By J. W. Blunt, Yoko Tanaka, and H. F. DeLuca* 1503

APPLIED BIOLOGY

THE HYPOCHOLESTEROLEMIC ACTIVITY OF ORALLY ADMINISTERED POLYENE MACROLIDES . . . . . *By Carl P. Schaffner and Harry W. Gordon* 36

MEDICAL SCIENCES

INDUCTION OF DNA POLYMERASE IN HUMAN LYMPHOCYTES BY PHYTOHEMAGGLUTININ . . . . . *By Lawrence A. Loeb, Shyam S. Agarwal, and A. M. Woodside* 827

GENETICS

DOSAGE REGULATION OF RIBOSOMAL DNA IN *Drosophila melanogaster* . . . . . *By Barry I. Kiefer* 85

CIRCULARITY OF YEAST MITOCHONDRIAL DNA . . . . . *By Charlotte J. Avers, F. E. Billheimer, H.-P. Hoffmann, and R. M. Pauli* 90

A TEMPERATURE-SENSITIVE GLUCOSE-6-PHOSPHATE DEHYDROGENASE IN MUTANT CULTURED HUMAN CELLS . . . . . *By Robert DeMars* 562

A NEW CASE OF TRANSMISSION RATIO DISTORTION IN THE HOUSE MOUSE . . . . . *By L. C. Dunn and Dorothea Bennett* 570

FUNCTION OF THE LACTATE DEHYDROGENASE *B* GENE IN MOUSE ERYTHROCYTES: EVIDENCE FOR CONTROL BY A REGULATORY GENE . . . . . *By Thomas B. Shows and Frank H. Ruddle* 574

THE DEGREE OF POLYMORPHISMS IN ENZYMES INVOLVED IN ENERGY PRODUCTION COMPARED TO THAT IN NONSPECIFIC ENZYMES IN TWO *Drosophila ananassae* POPULATIONS . . . . . *By John H. Gillespie and Ken-ichi Kojima* 582

In vivo INACTIVATION OF MAIZE ALCOHOL DEHYDROGENASE BY A TWO-FACTOR SYSTEM . . . . . *By Yoel Efron and Drew Schwartz* 586

GENE DUPLICATION AS THE BASIS FOR AMINO ACID AMBIGUITY IN THE ALPHA-CHAIN POLYPEPTIDES OF MOUSE HEMOGLOBINS. . . . *By Kurt Hilse and R. A. Popp* 930

THREE KINDS OF GENETIC VARIABILITY IN YEAST POPULATIONS . *By Christopher Wills* 937

DEVELOPMENTAL IMPLICATIONS OF MULTIPLE TISSUE STUDIES IN GLUCOSE-6-PHOSPHATE DEHYDROGENASE-DEFICIENT HETEROZYGOTES . . . . . *By E. Gandini, S. M. Gartler, G. Angioni, N. Argiolas, and G. Dell'Acqua* 945

PROBABLE ASSIGNMENT OF THE DUFFY BLOOD GROUP LOCUS TO CHROMOSOME 1 IN MAN *By Roger P. Donahue, Wilma B. Bias, James H. Renwick, and Victor A. McKusick* 949

A Deletion Analysis of Prophage Lambda and Adjacent Genetic Regions . . . . . *By Sankar Adhya, Pat Cleary, and Allan Campbell* 956

Genetic and Antigenic Studies and Partial Purification of a Human Serum Lipoprotein Carrying the Lp Antigenic Determinant . . . . . *By Jane S. Schultz, D. C. Shreffler, and Nancy R. Harvie* 963

The Role of Ecdysone in DNA-Puff Formation and DNA Synthesis in the Polytene Chromosomes of *Sciara coprophila* . . . . . *By Helen V. Crouse* 971

Glucose-6-Phosphate Dehydrogenase: Evidence for Tetrameric Structure in Doves (*Streptopelia*) . . . . . *By D. W. Copper and M. R. Irwin* 979

On the Structure of a Gene for Disease Resistance in Maize . . . . . *By K. M. S. Saxena and A. L. Hooker* 1300

Mammalian Cell Genetics, II. Chemical Induction of Specific Locus Mutations in Chinese Hamster Cells *in vitro*. . . *By E. H. Y. Chu and H. V. Malling* 1306

RNA Polymerase Mutants of *Escherichia coli*, I. Mutants Resistant to Streptovaricin . . . . . *By T. Yura and K. Igarashi* 1313

Genetic Transcription Directed by the b_2 Region of λ Bacteriophage . . . . . *By Susumu Tonegawa and Masaki Hayashi* 1320

ERRATA

A Two-Structure Model for Electrolytic Solutions . . . . . *By M. H. Lietzke, R. W. Stoughton, and R. M. Fuoss* 775

Mechanism of DNA Chain Growth, II. Accumulation of Newly Synthesized Short Chains in *Escherichia coli* Infected with Ligase-Defective T4 Phages . . . . . *By Kazunori Sugimoto, Tuneko Okazaki, and Reiji Okazaki* 775

Genetics of Somatic Mammalian Cells, VII. Induction and Isolation of Nutritional Mutants in Chinese Hamster Cells. . . . . *By Fa-Ten Kao and Theodore T. Puck* 775

Action of Antibiotics Affecting Membrane Permeability on the Electroplax . . . . . *By H. I. Silman and Arthur Karlin* 1502

CONTENTS (*Continued*)

BIOCHEMISTRY.—INTEGRATION OF ENERGY CONVERSION AND BIOSYNTHESIS IN THE PHOTOSYNTHETIC BACTERIUM *Rhodopseudomonas capsulata* . . . . . *By Gary A. Sojka and Howard Gest* 1486

BIOCHEMISTRY.—CONFORMATIONAL PROPERTIES OF POLYFORMYCIN: A POLYRIBONUCLEOTIDE WITH INDIVIDUAL RESIDUES IN THE *Syn* CONFORMATION . . . . . *By D. C. Ward and E. Reich* 1494

BIOCHEMISTRY.—THE BIOLOGICAL ACTIVITY OF 25-HYDROXYCHOLECALCIFEROL, A METABOLITE OF VITAMIN D_3 . *By J. W. Blunt, Yoko Tanaka, and H. F. DeLuca* 1503

ERRATUM.—ACTION OF ANTIBIOTICS AFFECTING MEMBRANE PERMEABILITY ON THE ELECTROPLAX . . . . . *By H. I. Silman and Arthur Karlin* 1502

Statement of Ownership, Management, and Circulation
(Act of October 23, 1962; Section 4369, United States Code)

TITLE OF PUBLICATION: Proceedings of the National Academy of Sciences of the United States of America. FREQUENCY OF ISSUE: Monthly. LOCATION OF OFFICE OF PUBLICATION: Easton, Pennsylvania (Northampton County). LOCATION OF GENERAL BUSINESS OFFICE OF PUBLISHER: 2101 Constitution Avenue, N.W., Washington, D. C. 20418. PUBLISHER: National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D. C. 20418. EDITOR: John T. Edsall, 2101 Constitution Avenue, N.W., Washington, D. C. 20418. OWNER: National Academy of Sciences (nonprofit corporation, no stockholders).

October 1, 1968 G. D. Meid, Business Manager (NAS)